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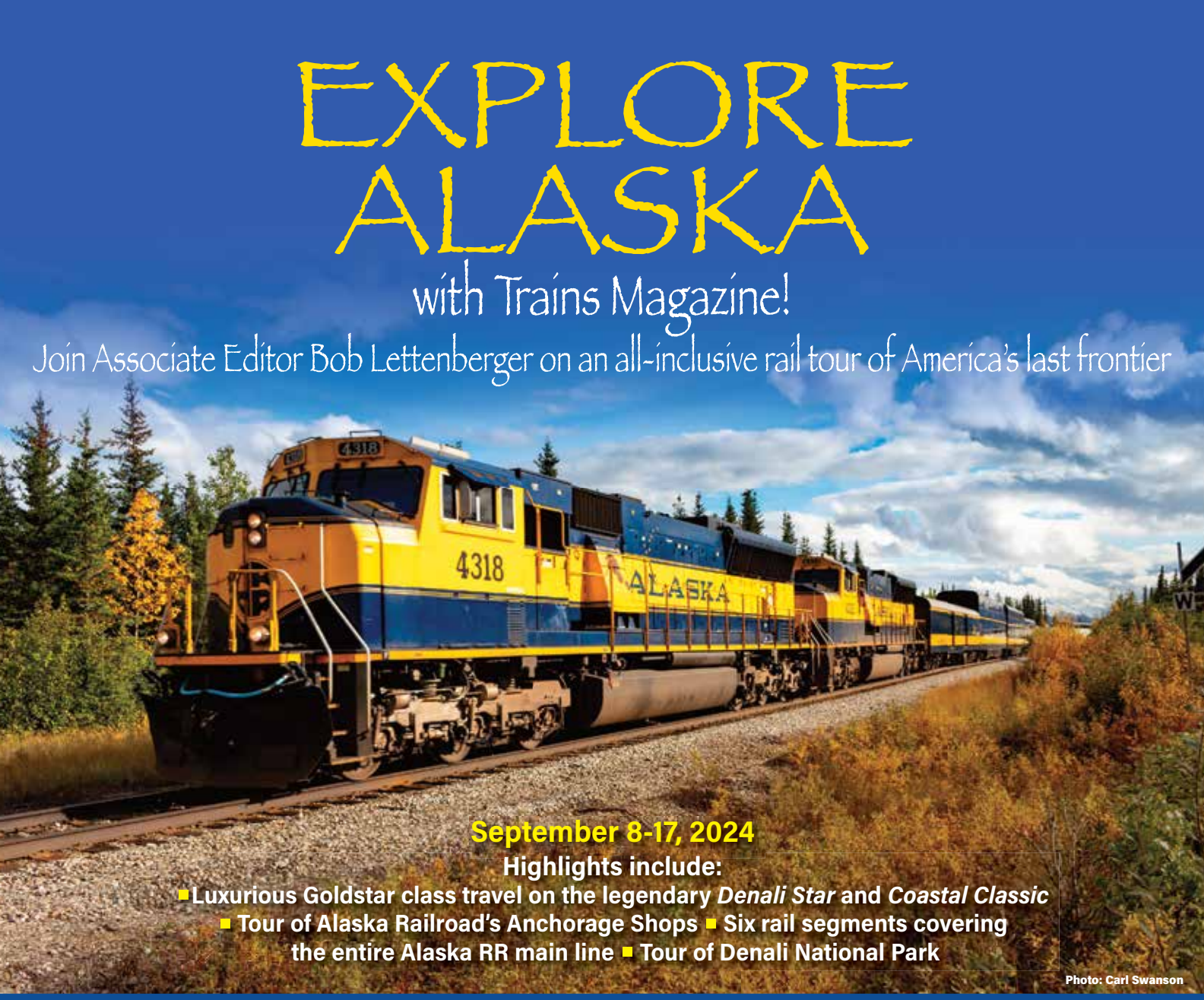

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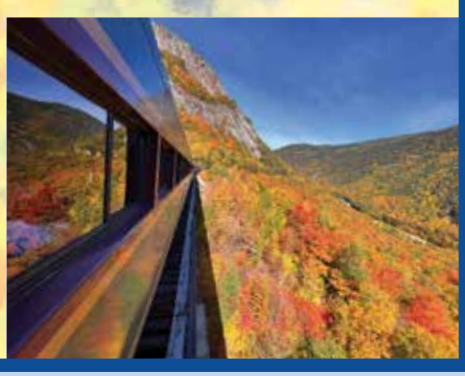

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From the Editor

Carl Swanson
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In British Columbia, Canadian National and Canadian Pacific Kansas City operate parallel lines through rugged canyons. It's a tough place to run a railroad, but it runs more efficiently since the rivals established the Directional Running Zone, in which westbounds from both railroads operate over one line, while eastbounds run on the other.

The results have been remarkable. As author Bill Stephens notes, "Without the DRZ ... neither railway could have handled the past two decades of phenomenal growth."

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Max (above) watches a train pass from tool car *Art Lockman* during UP No. 4014's layover in North Platte, Neb., in July 2023. Alan David

Minturn (on left) intently watches Amtrak's westbound *California Zephyr* rumbling through Little Gore Canyon between Azure and Radium, Colo., on Sept. 16, 2021. Mike Danneman

Finding articles that fit your interests

TRAINS.COM IS WHERE YOU WILL FIND a plethora of train-related topics focused around today's industry, as well as the history and the basics of railroading. From dynamic braking 101 to what's on a locomotive cab roof to what ever happened to the Great Circus Train, this is the website to forage for tips, facts, and, of course, fun.

It's a mix of material for everyone to enjoy — so dive right into a technical or exploratory article regarding life on, around, or with railroads. It's a great place to start, especially if you are new to trains.

Articles offer tips on subjects you may already be interested in or might have never thought to explore. Take "Railfanning with dogs 101," for instance. This particular subject is not the average technical topic, but it is (for some) an essential part of enjoying railroading and/or railfanning.

Another article, "Now that's a toilet: Answering nature's call on the railroad," may not be what you expected when logging into Trains.com on any given morning. However, it talks about a basic need for those working on and around the railroads, and how that gets addressed.

The topics here may take you on a slight detour, but isn't the ride the best — and most necessary — part of getting to your destination?

Take the detour and scan the QR code. — *Nastassia Putz, production editor*

Plus

Videos on News Wire

THE WIDE-RANGING subject matter of *Trains* News Wire focuses on daily breaking news throughout the railroad industry. While the emphasis is on words and photos, News Wire also includes video when the opportunity arises.

A good example is a recent short video from Wabtec. If you've wondered what it looks like to paint a locomotive, the company condensed the 7-to-10-day process — requiring two-person crews working two shifts — to just over a minute and a half.

The locomotive being painted in this video, incidentally, is not your run-of-the-mill diesel with your run-of-the-mill scheme. Instead, it's the first production FLXdrive battery-electric, built for Australia mining firm Roy Hill — which paints its units a distinctive, and rather untraditional, pink. Visit News Wire on Trains.com. — *Trains Staff*

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Ask us

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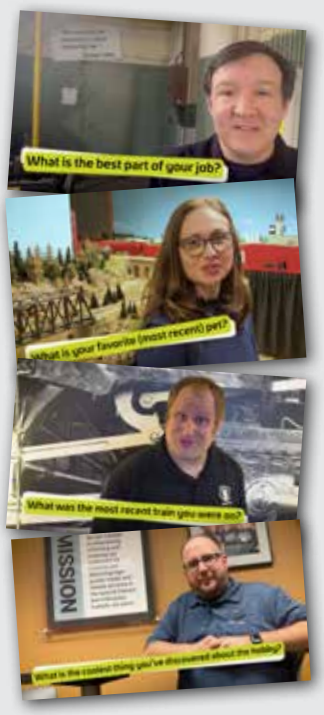
MEET MORE OF OUR STAFF through a series of a dozen questions we asked them about general to oddly specific topics. There are no stuffy sit-down sessions here!

It's all in good fun as cameras follow staff members such as Kevin Gilliam, Nastassia Putz, Lucas Iverson, Ben Lake, Roger Carp, Tom Danneman, and Rene Schweitzer as they're peppered with quick-hitting questions during the course of their work day.

Their answers (and actions along the way) reveal quite a bit about the fine folks who bring you so much of the content found on the leading digital outlet of all things trains.

Note: This video series is exclusively for Trains.com Unlimited Members to get to know the editors and staff of the titles they enjoy. — *Kent Johnson, executive producer*



Proxy fight seeks to replace NS CEO with former UPS president

Former CSX head of operations would become chief operating officer

▲ **With a storm brewing, Norfolk Southern train V24 crosses the James River as it returns to Richmond, Va., after working in West Point, Va., on April 1, 2022.** Anthony Savas

ACTIVIST INVESTORS in February launched a proxy battle that sought to wrest control of Norfolk Southern and oust CEO Alan Shaw.

Cleveland-based Ancora Holdings and its partners have a $1 billion stake in NS. They are critical of the railroad's safety record and Shaw's response to the Feb. 3, 2023, hazardous materials derailment in East Palestine, Ohio. Ancora noted that NS lags the industry financially and operationally, and blasted Shaw's resiliency strategy that has added costs amid a downturn in freight volume.

Ancora proposed a slate of eight new board members. Its CEO candidate, Jim Barber, is a former UPS president and chief operating officer. Ancora also touted former CSX Executive Vice President of Operations Jamie Boychuk as a replacement for NS Chief Operating Officer Paul Duncan. CSX dismissed Boychuk in August 2023.

Shaw defended his railroad's safety record, noting that mainline derailments declined 42% last year, and repeated his vow to "make things right" in East Palestine. Costs related to the wreck have topped $1.1 billion.

Shaw's operations strategy, unveiled in December 2022, involves not furloughing train crews during downturns. Keeping crews on the payroll would hurt the operating ratio over the short term, but would pay off in the long run by enabling NS to maintain service levels and handle the eventual traffic upswing, he says. And providing consistent and reliable service year in and year out will allow shippers to build more of their supply chains around the railroad, which in turn will bring NS new traffic, higher revenue, and bigger profits. It is, Shaw says, a better way forward for an industry that has struggled to grow due to periodic service problems related to crew shortages.

Surface Transportation Board Chairman Martin J. Oberman said a successful bid to reverse Shaw's strategy would dim the industry's growth prospects and hurt shippers, the economy, and the environment. Oberman, who was set to retire in late March, also said the activist's "shortsighted" efforts would invite more regulation in the wake of the widespread crew shortages that snarled rail service in 2022.

NS and Ancora submitted dueling proxies to shareholders in March. The railroad typically holds its annual shareholder meeting in May, but has not yet set a date for this year's meeting, where the vote tally would be announced. — *Bill Stephens*

Last regular Chinese steam operation ends

Conclusion of operations at coal mine closes three-decade run as final steam haven

STEAM LOCOMOTIVES DROPPED their fires for the last time in everyday use in China in mid-January with the end of operations at a coal mine in Xinjiang Province. This ended three decades in which the country became famous with railfans worldwide as the last refuge of steam operation.

New steam locomotives were still being built in the late 1990s, and mainline steam operation of the "Jing Peng" Jitong-Tongliao Railway in Inner Mongolia ended as recently as 2005. The Jing Peng line was the last place the Chinese QJ 2-10-2 locomotives were used for long-distance freight and passenger; 4,717 of these were built, and while most have been scrapped, three are in the United States. Nos. QJ 6988 and QJ 7081 have run on the Iowa Interstate but are currently out of service, while QJ No. 7040 is in Kentucky awaiting overhaul after running passenger trips between 2008 and 2013.

After the Jitong-Tongliao Railway converted to diesel, steam locomotives remained in widespread use, mainly at coal mines and steelworks. These locomotives, most of which were SY 2-8-2s (1,860 built between 1960 and 1999) or JS 2-8-2s, have been slowly replaced, mainly by second-hand diesels. These are widely available as China has invested heavily in high-speed rail and mainline electrification over the last two decades. Two SY locomotives are in the United States, although they never ran in China, having been built to order in 1989.

Sparks from the chimney: Barely a week before the end of steam operations, locomotive JS8089 works at the Sandaoling coal mine on Jan. 7, 2024. Nick Paton

SANDAOLING – LAST BASTION

Locomotives at a huge open-pit coal mine at Sandaoling, Xinjiang Province, became the last bastion of steam operation with 24/7 operation and multiple engines in use. Despite security restrictions following terror attacks elsewhere in Xinjiang about a decade ago, railfans from around the world continued to visit Sandaoling before the COVID-19 pandemic began in 2020. Visits were especially popular in mid-winter when the steam locomotives were most impressive, given the low temperatures in the desert area.

Sandaoling used a fleet of JS class 2-8-2 locomotives, with more than 20 in daily service as recently as 2015. Some 1,916 of the JS type 2-8-2 were built between 1957 and 1988. One, JS No. 8419, was sold to Iowa's Boone & Scenic Valley Railroad, where it was recently overhauled. It is the lone example of that locomotive type outside of China.

Steam at Sandaoling received a temporary reprieve in May 2018 when a plan to replace trains with trucks was deemed uneconomic. However, the pit had been expected to be worked out within three years and mine management had announced locally that steam operation would end in September 2021.

In the end, the mine and steam operation held on for more than two additional years, but on a smaller scale than a decade or more ago. By the start of the 2020s, three JS Class 2-8-2s worked daily in the pit, out of a pool of four, with one of the four serviced and cleaned each week. Six more locomotives were used pre-COVID for switching and short transfers to the China Rail mainline yard. Steam working in the open pit ended in August 2022, and all the tracks were lifted.

A small fleet of six-axle diesels has replaced the steam fleet. For many years, diesels were not permitted on some parts of the system due to axle loadings, but the Class HXN5B locomotives delivered in late 2022 are light enough to avoid track damage.

The last operational area was switching in the mine's South Yard, and in the last few months only three locomotives were in use. No. JS8314 had been in use until Nov. 26, 2023, when a large truck hit it at a crossing, seriously damaging the tender but fortunately not harming the crew. Following approval for use of the HXN5B diesels in the fourth week of December, No. JS8366 was taken out of service on Dec. 26, leaving only No. JS8089 in service. It was retired Jan. 15 to end steam operations; in its last weeks, it had switched the yard and made short trips to the China Rail interchange sidings, sometimes with a new innovation — cars loaded with open-topped shipping containers of coal.

There may still be a small amount of steam switching at mines in Bosnia, but this is mainly for visiting photographers. There may also be steam operations in North Korea, although these are likely inaccessible to any railfan. — *Keith Fender*

FRA proposals do not specify route details; some segments shown are estimated.

FRA offers new Amtrak long-distance proposals

Funding to implement operations not a part of 'daily service study'

FIFTEEN ROUTES made the short list of prospects for long-distance trains released in February by the Federal Railroad Administration, developed from a series of workshops to determine additions that might provide enough connectivity to enhance Amtrak's existing skeletal system. Final recommendations to Congress are to be determined after these options are discussed at regional meetings this spring including Amtrak and host-railroad representatives, state transportation officials, passenger rail advocates, and civic leaders.

The "Daily Long-Distance Service Study" is funded under the Infrastructure Investment and Jobs Act. It contains no money to evaluate, engineer, or construct infrastructure improvements that might be needed to start service on routes that in some cases last hosted passenger trains in the 1950s. It is separate from another FRA-sponsored planning grant initiative from the same legislation, the Corridor Identification and Development Program [see "Routes selected for FRA's Corridor program," "News," March 2024].

Twenty-two of the 69 projects selected for the Corridor ID project include trackage that would also be utilized in the routes in the long-distance study. The PowerPoint presentation detailing those routes, available at fralongdistancerailstudy.org, was released to invite public comment. At a high level, the plan seeks to evaluate costs, benefits, and financing information to help identify final recommendation and implementation strategies. Then it will be up to Congress to fund any network expansion, with the caveat — listed throughout by the FRA — that "further analysis after completion of this study would be necessary to advance the preferred routes through the planning and project development activities prior to implementation."

At this formative stage, the size of cities served and the travel demand they could generate appears to have played an outsized role in the selection process, compared to

Nashville's former Union Station is now a luxury hotel, but the CSX route that once hosted the Chicago-Miami *Floridian* could still accommodate a passenger platform. Bob Johnston

the track and facility investments a route might require. For instance, Chicago-Florida service once offered by the *Floridian* through Louisville and Nashville would be routed farther south through Chattanooga, Tenn., so the train could provide much-needed north-south connectivity at Atlanta. Stopping in both of those cities, though, would be problematic because connections to former station locations have been severed. However, the Chattanooga-Atlanta route received a Corridor ID grant, so issues can begin to be addressed.

The document suggests it will take 15 years to get new routes rolling, although the choices show opportunities to get service operating much sooner. A restarted *Desert Wind* extension of the *California Zephyr* from Salt Lake City through Las Vegas to Los Angeles could run on tracks that can accommodate fast passenger trains, using existing stored Superliners and a minimum of facility investment.

But can Amtrak and Congress rise to such a challenge? After all, every discontinuance addressed by the map was triggered by a combination of federal funding cuts and company reasoning that, at the time, saw the service as expendable. Those decisions resulted in abandonment of multiple portions of the New York-Kansas City *National Limited*'s route between Pittsburgh and Indianapolis that will force a proposed Dallas-New York train to use circuitous substitutes.

The challenges in establishing new service have been on display since 2016 on the Gulf Coast. That's where efforts to restore operations on a route that once hosted the triweekly *Sunset Limited* have been mired in acrimonious Surface Transportation Board hearings, self-imposed secrecy by the participants to hide "commercially sensitive" data, and intransigent city officials taking cues from the economically influential Port of Mobile's attempts to torpedo federally financed capacity improvements, from which both citizens and port will benefit.

Before proposed long-distance routes originating west of New Orleans can pass through Mobile to Detroit, New York, and Miami, as the map portrays, a more streamlined expansion approach must be conceived. And if Amtrak is to be the operator, the company needs to be more transparent on how its costs are calculated.

Presumably the FRA's final long-distance blueprint will evaluate the cost-benefit tradeoff of upgrading sections of unsignaled, low-speed track through sparsely served rural areas for once-daily passenger service. Harder to solve will be the challenge of creating a consistent funding source to ensure that any investment doesn't meet the same fate that befell the *Floridian*, *Pioneer*, and *National Limited*. — *Bob Johnston*

TENTH IN A SERIES **CSX Transportation unveiled the 10th locomotive in its heritage fleet in February, honoring predecessor Richmond, Fredericksburg & Potomac Railroad. As is customary with the CSX heritage series, the locomotive's No. 1836 reflects the year of the RF&P's founding. Like the nine earlier locomotives, the latest unit was painted at CSX's shops in Waycross, Ga.** CSX

NEWS BRIEFS

Metra orders battery-electric trains from Stadler for Rock Island District service

Chicago's **METRA** announced it would buy eight two-unit battery-electric trainsets from **STADLER U.S.** for use on the Rock Island District's Beverly Branch, a 16.4-mile service between La Salle Street station downtown and Blue Island, Ill. The contract, worth up to $335.4 million, is funded in part by a $169.3 million federal grant. It includes options for another eight trainsets, as well as up to 32 trailer cars that can expand the trainset to three or four cars. The first trainsets, expected to be delivered in 2027 or 2028, will have a range of 45 to 65 miles.

METRA was also one of three agencies to receive **FEDERAL TRANSIT ADMINISTRATION** funding for new equipment under the Rail Vehicle Replacement program, landing $100 million to help fund 50 new multilevel commuter cars. Other grants went to the **SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY**, $317 million toward 200 new railcars for the Market-Frankford line, and the **MARYLAND TRANSIT ADMINISTRATION**, $213.6 million toward replacement of the entire Baltimore light rail fleet.

STADLER also will build six more hydrogen-powered trainsets for California, the state's Department of Transportation, **CALTRANS**, announced. That brings to 10 the number of FLIRT H2 trainsets on order for use in the planned **VALLEY RAIL** service in the San Joaquin Valley. The new equipment exercises an option in the original four-train order in October 2023; the first of those trainsets are projected to enter service in 2027.

WABTEC and **CSX TRANSPORTATION** announced a deal for the modernization of the railroad's remaining AC4400 locomotives, an agreement covering more than 200 units. Upgrades including the FDL Advantage engine and digital improvements such as Locotrol Expanded Architecture will provide fuel savings and carbon reductions of up to 8%, the companies say. This follows 260 rebuilds previously ordered by CSX; most of those have already been delivered.

Frustrated by the lack of information presented at a Feb. 14 hearing, the **SURFACE TRANSPORTATION BOARD** ordered **AMTRAK**, **CSX TRANSPORTATION**, **NORFOLK SOUTHERN**, and the **PORT OF MOBILE**, Ala. — parties in a deal to allow the start of New Orleans-Mobile passenger service — to return in 30 days with detailed information on the nature of delays preventing the start of that service. The board sought more information on such details as the status of a lease for a station site in Mobile; Amtrak operating agreements with Mobile and Mississippi; and an agreement to spend a $178 million federal grant for route improvements.

Fate of freight rail hinges on NS proxy fight

Activist investor would limit intermodal growth

Bill Stephens
bybillstephens@gmail.com
Analysis: Trains.com

The proxy battle waged by Ancora Holdings against Norfolk Southern isn't just about the direction NS should take and who should run the company. It's a fight for the future of the railroad industry.

The Cleveland-based activist investor seems to be taking the position that railroads shouldn't grow. They argue that intermodal isn't profitable enough to make up for the delays it inflicts on lucrative merchandise and bulk traffic. So Ancora says NS should forgo intermodal growth and instead maximize the efficiency and profitability of its carload and bulk business, all while slashing costs and boosting productivity.

This is a fine strategy if you're a short-term investor. The stock price will rise and you'll pocket a handsome return well before the cash cow is milked dry.

But if you're thinking long term, this approach has a fatal flaw. Carload business is shrinking, and you can't forever earn more and more money on less and less business.

Merchandise traffic is a leaky bucket. Carloads are draining out of the bucket faster than new business is trickling in. Overall carload volume has been sinking for decades, a trend that has been most pronounced in the East. And there's no sign that will change.

In Norfolk Southern's case, carload traffic has fallen 9% over the past five years. Meanwhile, coal is down roughly 50%. The railroad's intermodal traffic, on the other hand, surged 9% over the last five years. But since hauling containers comes with an operating ratio above 60%, Ancora argues that more intermodal traffic shouldn't be on the railroad.

On a bright winter day in February 2017, Norfolk Southern intermodal train 20Q (left) meets the rear-end helpers of westbound NS train 19G 3 miles east of Cresson, Pa., on the Pittsburgh line. Alex Mayes

NS CEO Alan Shaw has sought to stem the decline of carload business while at the same time gaining new intermodal traffic. Both goals require consistent and reliable service year in and year out. Shaw's "better way forward" strategy aims to do just that.

The idea is that by not furloughing train crews during a downturn, the railroad will have the resources to respond to an upswing in traffic. In the short term, carrying surplus crews raises the operating ratio. But Shaw says it will pay off in the long term. First, it avoids service recovery costs and lost volume. Second, maintaining service levels through thick and thin will allow shippers to build more of their supply chains around the railroad, which in turn will bring NS new traffic, higher revenue, and bigger profits.

"Leadership's operating plan has resulted in higher costs, shrinking margins, and a worse operating ratio," Ancora notes with a firm grasp of the obvious. This is a feature of the NS strategy — not a bug — and it's exactly what Shaw said would happen in a low-demand environment like 2023.

Ancora says Shaw's service resiliency theory is untested and unproven. But we know the results of not keeping a buffer of train crews: Lost freight volume. Periodic bouts with crew shortages have long plagued the industry. The culprit? Wall Street's focus on the operating ratio, which prompts railroads to run leaner than they should.

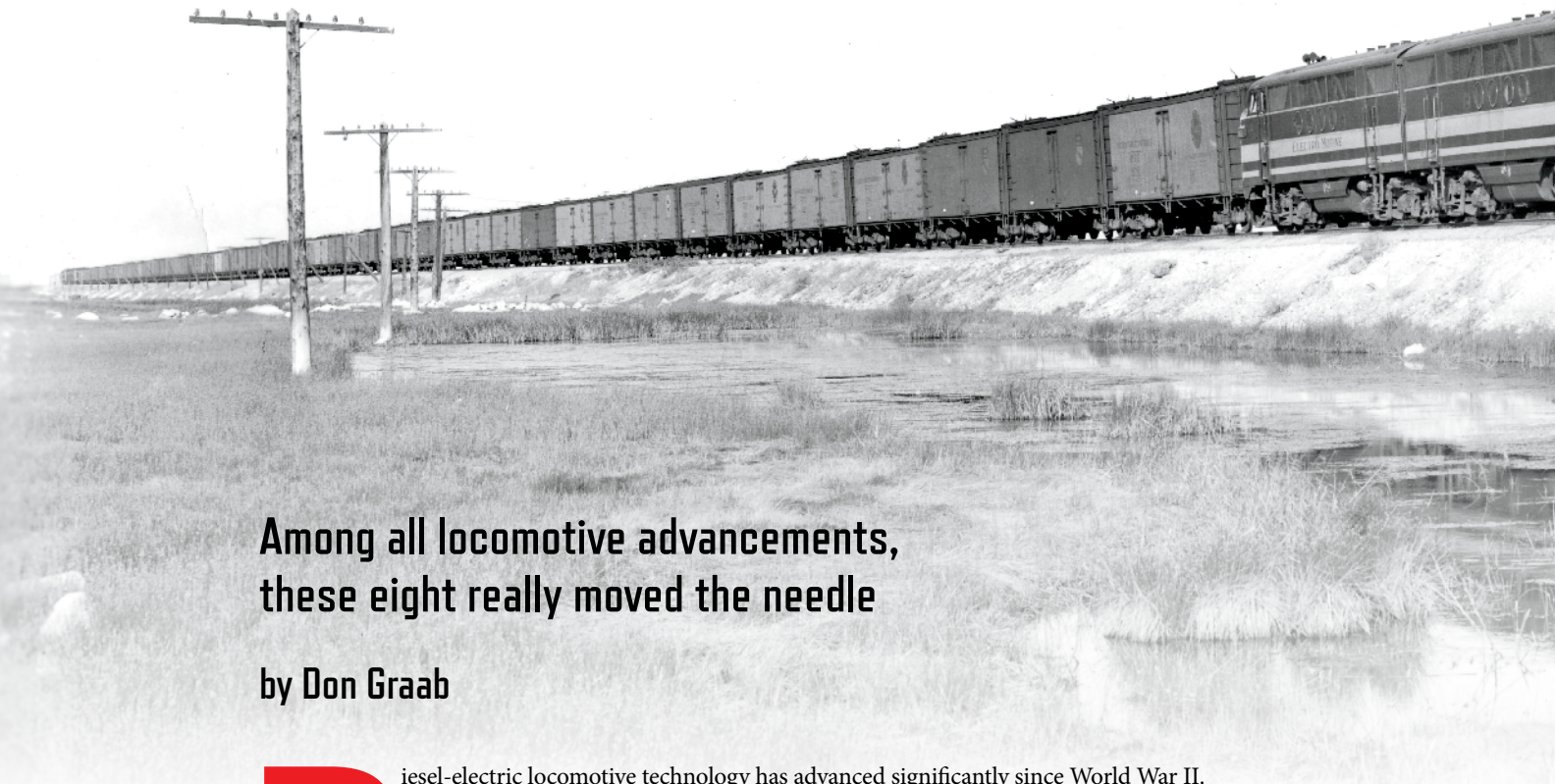
Ancora's call for cost-cutting and crew furloughs is tone deaf. The U.S. railroads have just come out of the mother of all crew shortages, which prompted a backlash from shippers and regulators while diverting freight to trucks.

The meltdown further damaged relationships with shippers who were already weary of disruption from the implementation of Precision Scheduled Railroading operating models at the publicly traded U.S. railroads. That does not bode well for the intermodal traffic that has been railroads' growth engine, or for the carload business that generates two-thirds of the industry's revenue.

Consider that a major carload shipper shifted 40% of its rail traffic to trucks during the widespread service problems on the big four U.S. railroads in 2022. A quarter of the company's normal rail volume remains on the highway today — and it may never return. Railroads cannot get caught short of crews again and must break the cycle of staffing-related service failures.

Across the industry, rail executives are concerned about Ancora's proxy battle at NS. The message it sends: Short-term activists will target any railroad that reduces the emphasis on the operating ratio while trying to create an upward spiral of service, growth, profits, and investment. And that, they say, will have a chilling impact on rail volume and the long-term prospects of railroads, their employees, customers, and shareholders. T

DIESEL TECHNOLOGICAL BREAKTHROUGHS THAT DID IT



Among all locomotive advancements, these eight really moved the needle

by Don Graab

Diesel-electric locomotive technology has advanced significantly since World War II. Experience leads me to list these eight technological breakthroughs as the most important in the postwar period. Important technology developments preceded World War II, but we began with the era after General Motors' Electro-Motive Division introduced "The Diesel that Did It," the FT [see "FT … the diesel that did it," May 1965]. This cab unit stormed U.S. railroads, demonstrating the value of diesel-electric locomotives. The FT set performance standards as technology stabilized around a platform of electromechanical systems, changing the way railroads operated for decades.

Listed chronologically, these eight breakthroughs span 50 years. They do not include diesel engine advances, as those easily fill another article. Some of the breakthroughs discussed are no longer pertinent today, but played a critical role in advancing locomotive technology.

Diesel-electric locomotives find their origin in streetcars. By 1900, lightweight vehicles with two-axle trucks, wooden carbodies, little heat, and no air conditioning were trundling along many urban streets powered from above by direct current. A decade later, their big cousins — the interurban cars — emerged, connecting urban areas. Interurbans owned their own rights-of-way, and often traveled at frightening speeds, but were early casualties of the automobile. Streetcars and interurbans shared technology. They both used spring-loaded pantographs, whose carbon brushes grabbed 600-volt DC power from above, sending electricity to axle-mounted traction motors. Their series-wound shunt motors were ideal for variable speed control from an eight-position rheostat. Early on, the goal became to say goodbye to overhead wires and take the power-generating source along aboard the passenger vehicle.

▲ **Technological advancements in rail diesel propulsion came together in the Electro-Motive Division FT — "the diesel that did it" — with enough success to move motive power away from steam for good.** *Trains* collection

BREAKTHROUGH: AUTOMATIC TRANSITION

Automatic transition for diesel-electric or electric locomotives is analogous to an automatic transmission for highway vehicles. Why don't locomotives have mechanical transmissions? A transmission is necessary to reduce the high rotational speed of the diesel engine to the low speed, high torque of locomotive drive wheels. Mechanical transmissions lack the flexibility and durability needed for North American road locomotives. A hydraulic coupling of the diesel engine and drive wheels is possible and was briefly used in the 1960s on locomotives imported by the Southern Pacific and Denver & Rio Grande Western. This arrangement lacked flexibility and incurred high maintenance costs.

An electrical coupling — an electric generator (later alternators) connected directly to the diesel engine crankshaft — is practical. Such rotating equipment provides the current for electric motors geared to the driving axles. Thus, we have onboard power generation replacing overhead wires supplying electrical power to a true electric locomotive.

One more step is necessary to make this work: transition. When the armatures of DC motors rotate, they create counter or back electro-motive force that bucks the applied generator voltage. Back EMF is a function of motor design and rotational speed. The faster the locomotive goes, the more back EMF traction motors create. At some point, the back EMF becomes great enough that, when combined with armature resistance, the locomotive cannot accelerate further. This can be overcome with more generator voltage; however, a rotating generator has its limitations. There is another solution, requiring changes in the traction motor power circuit. Since each traction motor has a certain amount of inherent resistance, the power circuit can be rearranged to diminish resistance. When the traction motors are placed in series, each motor experiences the most current and offers the highest resistance. When placed in parallel, the total motor set resistance is cut dramatically, and a reduced amount of current is available for each motor. Between the initial series circuit and subsequent parallel power circuits, there is an intermediate step. The motors can be arranged in a circuit that is partially in series and partially parallel, called series-parallel, which provides a more modest

1949-1954
EMD GP7
The road switcher version of the FT

1961
KRAUS-MAFFEI ML-4000
Hydraulic transmission

Above, EMD; right, Trains collection

▲ **DYNAMIC BRAKE The electric energy created by dynamic braking is dispelled as heat from resistors via the large fan (center) atop the locomotive. This is a new EMD GP60 in 1990.** EMD

drop in resistance without as large a reduction in available current.

The concept works because DC-series shunt motors excel at producing low-rotational-speed torque but require much current to do so. On the other hand, DC service shunt motors at high rotational speeds need more applied voltage to keep turning, but not nearly as much current. The characteristics of DC-series shunt motors fit perfectly with freight locomotive requirements.

In the early days, operators had to manually throw a transition lever, once or sometimes twice at prescribed speeds, to affect the circuit change, gaining the necessary acceleration. The reverse was also true. Early diesel-electric locomotive engineers had to move a transition lever to actuate "backwards" transition when slowing down — like downshifting in a manual-transmission truck. In extreme cases, the engineer moved the brake handle, throttle, and transition lever, all in short order. Hence, EMD engineers came up with an automatic transition.

For any DC traction motor, whether the locomotive utilizes four or six motors, the point at which transition becomes necessary is definable in terms of current (amps) and voltage. The EMD solution used current transducers and voltage readings to pick up relays at defined levels. In turn, these activated power contactors (large, electrically controlled power switches) to reconfigure the traction motor power circuit arrangement. Another version of combatting back EMF involved placing resistors in parallel with the field coils of each traction motor. In some designs, many steps of changing the amount of parallel resistance were included. Eventually, the output of larger traction alternators, and the introduction of AC motors, made transition unnecessary.

BREAKTHROUGH: DYNAMIC BRAKE

Dynamic braking utilizes the traction motors as generators retarding forward motion. For rotating electrical equipment — motors — there are two inputs and one output. For a motor, the inputs are power to the armature and field coils. The output is rotational torque. As a DC generator, the same machine receives inputs of power to the field coils and rotational torque to the armature, resulting in an output of electrical energy.

In the early days of diesel-electric locomotives, dynamic brakes were viewed by some railroads as an unnecessary, expensive option. Dynamic brakes added about 40% to the electrical circuits of pre-microprocessor locomotives. Additionally, the large resistors (called grids), used to dissipate the electrical energy as heat, slowly deteriorate with use. Illinois Central, with flat terrain, was inclined to use George Westinghouse's traditional automatic air brakes. On the other hand, a mountainous railroad like Norfolk & Western saw wisdom in the dynamic brake and ordered this option on its first diesel units. Doubtless, dynamic braking on mountainous terrain has aided operations and prevented accidents.

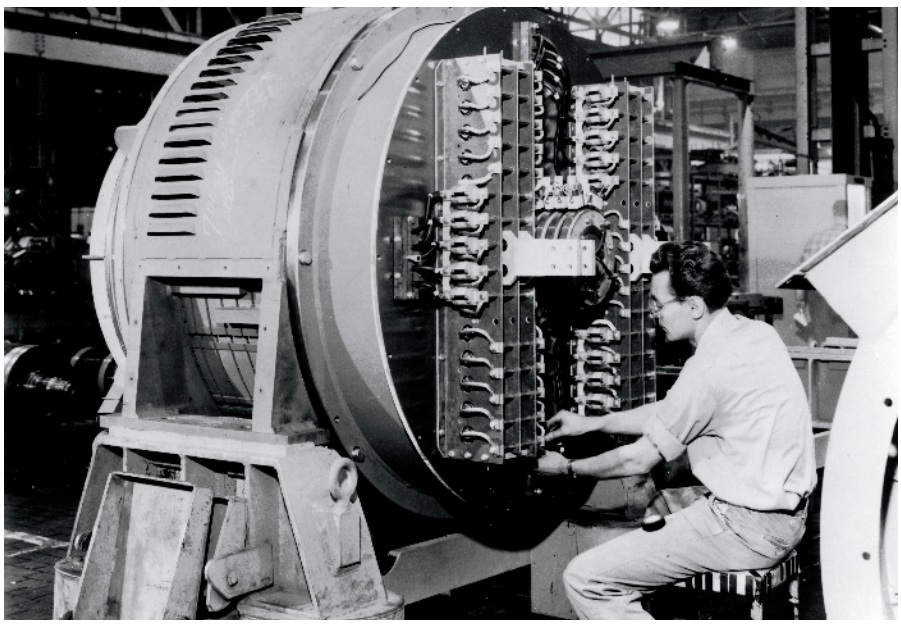
After the conversion to diesels, dynamic braking functionality improved. Southern Railway experimented with extended-range dynamic braking, which unlike earlier versions was effective at slow speeds. Dynamic braking advanced again when a "high capacity" brake was introduced during the DC locomotive high-adhesion era (1980-2004). Dynamic braking became more effective with AC traction motors, making it possible to almost stop a train. Even before AC locomotives, every North American railroad was specifying the high-capacity, extended-range dynamic brake for new road power.

Dynamic brakes are easy to operate, retard a train's motion promptly, and consumes none of the compressed air needed for emergency applications, which might be made in mountainous territory. Further, brake shoe wear is minimized, and overheated or slid-flat wheels are avoided.

1965–1971
EMD GP40
AR10 traction alternator

1972–1989
EMD SD40-2
Exane™ wiring

Above, Robert Krone; right, Robert Kaplan



▲ **RECTIFYING DIODES are installed on a new EMD AR-10 alternator in 1965. The diodes convert AC generated by the alternator to DC for use by the traction motors.** Two photos, EMD

Use of dynamic braking "bunches the slack" between couplers. This can also be accomplished with an independent application — a brake application independent of the automatic air brake application on the cars and locomotives — of the locomotive air brakes. This practice is contrary to operating rules due to the probability of generating flat spots. Further, dynamic brakes have far more train braking power than the independent locomotive friction brakes. Releasing the dynamic brakes is faster and simpler than releasing the automatic application of the train's air brakes.

BREAKTHROUGH: RECTIFYING DIODES

For a long time, locomotive designers were looking forward to switching from DC generators to AC alternators. When it comes to rotating electrical equipment, brushless motors and generators are desirable. Any design that eliminates carbon brushes reduces maintenance, which improves reliability.

In 1966, EMD settled on a diode technology sturdy enough to withstand the locomotive environment. EMD's first traction alternator, the AR10 (Alternator Rectifier), produced AC current that was then rectified to DC (for the motors, since AC traction motors were still many years away) after passing through diode banks mounted on the outside of the traction alternator.

The diode technology expanded alternator output. This eventually eliminated transition, which further improved reliability.

BREAKTHROUGH: EXANE™ WIRING

The problems of locomotive wiring with neoprene insulation were well known to maintenance workers and EMD by the 1960s. As a result, EMD engineers developed a new specification for insulating materials for both control wiring and power cables. At the time, the issue came to a head in the extreme heat and humidity of a Brazilian customer's mining railroad.

The solution was a new insulating material. The product, from International Telephone and Telegraph Co., nearly matched the specifications EMD developed. Initially called ITT Surprenant Cable, this wire with superior insulating material came to be called Exane™ wiring. Irradiated with X-rays, the cable was used on transit cars, oil rigs, and in nuclear power plants. It performed well in temperatures from minus-67 degrees to 257 degrees Fahrenheit, while resisting the effects of oil, abrasion, impact, water, and flame. The downside of Exane™ is that for large conductors, the cable is stiff.

▲ **EXANE WIRING There are miles of wire inside a diesel locomotive. Being better suited to the locomotive environment, Exane wire extended running life to more than 50 years.**

1980–1985
GE B36-7
DC high-adhesion units with solid-state controls

1980–1985
EMD GP50

Above, Michael S. Murray; right, Mike Danneman

Exane™ wire, introduced in 1972, greatly extended locomotive life, earning it a place in the top eight. By the mid-1990s, some late-1960s GP38s had wiring with crumbling insulation — locomotive arterial heart disease. With no economical remedy, the solution was rewiring the entire locomotive. As a result, many locomotives were retired after 20-25 years, while thousands of Exane™-wired GP38-2s, GP40-2s, and SD40-2s remain in service today — some running more than 50 years.

BREAKTHROUGH: WHEEL CREEP

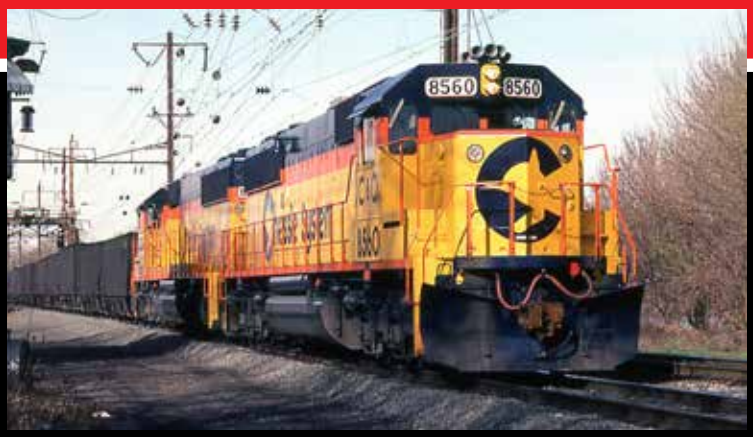
Low resistance between steel wheel and rail makes the railroad fuel efficient. What is good for railcars, however, creates locomotive problems, particularly in wet weather. Tractive effort — a locomotive's pulling force — divided by the locomotive's weight equals adhesion. Adhesion defines how well wheels grip the rail. Adhesion increases with tractive effort, but when adhesion is greater than the friction between rail and wheel, the wheel will slip. It doesn't take much wheel slip for tractive effort to decrease. Steam locomotives had issues with wheel slip, as did the first diesel-electric locomotives, which depended upon the engineer to turn on the sanders and reduce power.

In the 1960s, EMD developed the Wheel Slip (WS) module and later the Instantaneous Detection and Correction (IDAC) module to automatically control wheel slip. This early system reduced power to the traction motors when wheel slip was detected. Even with these systems, the all-weather average dispatchable locomotive adhesion on units like the Dash 2s was just 18%.

Through years of testing, EMD engineers came to suspect limited, controlled wheel slip could be advantageous, particularly when compared with severing power to all motors. Adhesion is greatest when the wheels are slipping just a little, which is known as creep. EMD introduced this philosophy with its Super Series system on the GP40X and increased adhesion to 24%. The GP50s and SD50s used this technology. Enhancements were made to the wheel creep control systems until the SD70s produced 28% adhesion. Today, AC locomotives locomotive can achieve all-weather dispatchable adhesion of 33%. On good, dry rail, 44% adhesion is possible.

Controlled wheel creep systems work by monitoring traction-motor power demand, torque, the rotational speeds of one or more motors, and knowing the true ground speed. At first, motor speed was obtained by using axle alternators. Today, speed probes mounted on each traction motor are common. EMD determines true ground speed with a radar unit mounted behind the front pilot. Controlled wheel creep works with a closed feedback loop system. Utilizing the known traction-motor electrical torque and speed characteristics, the horsepower applied to the rail, wheel speed, and true ground speed, the control system will allow limited wheel creep to deliver more horsepower. Wheel creep is continually adjusted based on traction-motor torques, horsepower and rotational speeds. Once the full available horsepower is applied to the rail, wheel

▲ WHEEL CREEP **A Pan Am Railway GP40 loses it footing at a higher speed, causing a shower of sparks. The slippage could damage the traction motors, wheel, or the rail. One way to decrease wheel creep is with high-adhesion trucks. Union Pacific No. 5355, a General Electric ES44AC, rides on Hi-Ad trucks introduced with the Dash 9 series in the early 1990s.** Left, Robert A. Stein; right, Jeff Wilson



1980–1987
EMD SD50

1978–1989
GE C36-7

Above, Michael S. Murray; right, GE

▲ **MICROPROCESSOR CONTROLS govern numerous aspects of modern diesel locomotives. They can be programmed to fine-tune control of a unit and provide the crew with real-time operating data.** Eric Powell

creep stops. Typically, wheel creep is utilized at low speeds, whereas full horsepower is applied at high speeds.

EMD patented this technology, but GE Transportation quickly developed a clever electrical engineering solution that accomplished the same results for its B36-7 and C36-7 units. Later, the benefits of wheel creep were reproduced by software in microprocessor control systems, first with DC and later with AC traction motors. AC traction provides superior wheel creep characteristics as the inverters can better control power to the motors. This is one of the factors contributing to the superior tractive effort of AC locomotives.

BREAKTHROUGH: MICROPROCESSOR CONTROLS

By the 1980s, relay logic, often combined with solid state circuits, was rapidly being replaced across all industries by Programmable Logic Controllers (PLCs). Companies such as Allen Bradley, Fanuc, and General Electric were producing PLCs for process control. It was inevitable that PLCs would be used in diesel-electric control systems, first appearing aboard the six-axle GE C39-8 and EMD SD60.

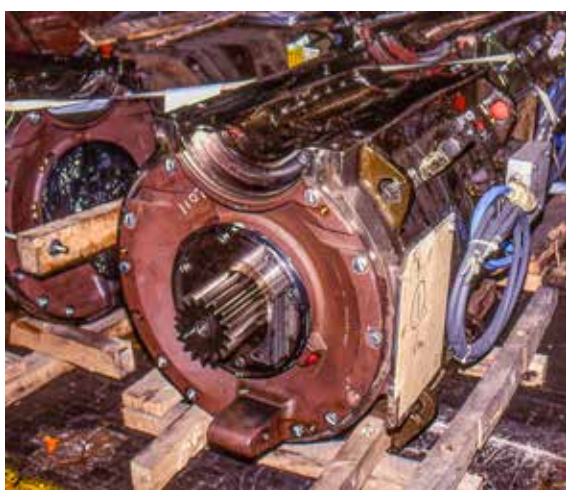
Just as in automobiles, microprocessor control changed locomotives into software-driven vehicles. Thanks to an array of sensors, locomotive functions from engine coolant temperature to fuel consumption are under programmable control. In fact, separate microprocessors have been introduced for subsystems such as diesel engine fuel injection and pneumatic brakes. Today, customized software is written for everything from emission control to helpful operator information. When locomotive modifications are necessary, rather than upgrade or replace physical components, most changes are made with new software releases.

BREAKTHROUGH: AC TRACTION MOTORS

When it comes to fixed-speed applications, AC motors have dominated for decades. Adapting AC motors to variable-speed applications, in lieu of DC motors, was a slow process. Variable-speed AC motors were adapted to manufacturing plants, rolling mills, conveyor belts, mining, and other applications. With the vigorous demands and complexity of motor controls, locomotives were one of the last applications to change to variable-speed AC.

AC motor design was not as much of a challenge as designing the motor control system. This was made possible when gate turn-off thyristor (GTO) technology was developed by GE. GTOs are high-powered semi-conductors that function as an inverter when controlled by a microprocessor, converting DC to AC current. Inverters, however, do not produce a true sinusoidal wave form. Rather, they generate pulse-width modulation that resembles a sinusoidal wave form. The combination of GTOs and microprocessors make variable-speed AC motors practical in robust, high-power applications.

Eager to take the lead in AC propulsion, EMD partnered with Siemens for control systems and inverters. Siemens adapted an existing traction motor design to the North American market with one GTO inverter driving each three-axle truck. After a few SD60MAC proof-of-concept units, Electro Motive rolled out three AC models: the SD70MAC (4,000 hp); the limited-production SD80MAC (5,000 hp, 710 V-20 engine) and the less successful SD90MAC (intended for the 6,000-hp H engine; most received a 4,300-hp 710 engine). The new AC motors increased torque by a whopping 20% over DC predecessors, performed



▲ **AC TRACTION MOTORS, like this GE GEB13, have simpler design, allowing finer control and making them nearly impossible to burn out from overloading.** Greg McDonnell

1992
EMD SD60MAC
Prototype AC power

1993–2004
EMD SD70MAC
First-generation AC power

Above, EMD; right, Craig Williams

dramatically better at low speeds, and eliminated the "short time" motor ratings required to avoid overheating DC motors.

GE quickly replicated EMD's initial success with AC traction, introducing its AC4400 (4,400 hp) locomotive. Despite BNSF's huge order of the EMD SD70MAC for coal service, GE produced more AC units in the first generation of this locomotive type. An important difference between the SD70MAC and AC4400 was the use of GTO inverters. EMD used one inverter per truck to drive three traction motors. GE used one GTO inverter per traction motor. GE developed an extensive marketing campaign directed towards railroad management on the advantages of six inverters. This, combined with the higher horsepower and reliability of the AC4400 units, led to widespread acceptance. By 2017, Progress Rail was also using one inverter per traction motor — now called "single-axle" control.

BREAKTHROUGH: DISTRIBUTED POWER

The advantages of long, heavy trains have been known for decades. Longer trains require fewer crews and reduce fuel costs when heavy trains are closely matched to the tractive effort of the locomotives. Today, all Class I railroads are running more distributed-power trains.

Distributed Power™, as we know it, began on the Southern Railway during the innovative time of President D.W. Brosnan [see "When little trains made big trains," February 2023]. As diesel-electric locomotives became more powerful, Brosnan espoused the vision of a "1,000-axle train," utilizing remote-control, mid-train locomotives to make 250-car trains possible. To achieve this, he tasked the electrical engineers of his Signals and Communications department to design a system mimicking the actions of an engineer on the lead locomotive.

Combining germanium (a shiny gray semimetal) logic transistors with Westinghouse Air Brake's electrically controlled spool valves, the communication engineers used radio (VHF initially, later UHF) to remotely control the mid-train locomotives. Southern Railway supplied drawings and specifications to North Electric Co. of Galion, Ohio, which produced the RCE (Radio Controlled Equipment) or RCS (Radio Control System). Southern began testing the system in the early 1960s. The first production systems were introduced in 1965. (North Electric was purchased by Radiation Inc. of Melbourne, Fla., in 1963.) The hardware was large and clumsy by today's standards. Southern opted to place the radios, circuit boards, and air brake equipment for remote units in ballasted, M.U.-equipped boxcars. The perceived advantage was the ability to use any locomotives in the remote consist. Dedicated control locomotives at the front of the train had hardware placed on the control stand and in Southern's characteristic high short hood.

In addition to crew and fuel savings, distributed power offers other advantages:

- Reduced in-train forces make longer trains less susceptible to coupler and draft gear failure that leads to break-in-two events.
- Reduced in-train forces help track structure by lowering lateral forces between the wheels and rail in curves.
- Faster, more uniform application and release of train brakes, as remote units immediately respond to the automatic brake valve.
- Compared to trains of the same length and tonnage, distributed-power trains move across the railroad faster and may require less power.

▲ **DISTRIBUTED POWER has become a common tool giving railroads a number of advantages. Here a Canadian National ES44AC runs as the rear DPU on a CSX train.** Waylon Moore

- Reduction in string-line derailments, where lightly loaded or empty cars on the head end are pulled off the rail in curves.

In retirement, D.W. Brosnan, who was heralded for his many productivity accomplishments, promoted using RCE trains. Santa Fe, Canadian National, Canadian Pacific, and the Quebec, North Shore & Lab-

1993-2004
GE AC4400CW

2012-PRESENT
GE ET44AH
Tier IV locomotive

Above, Nate Shedd; right, Waylon Moore

rador railroads all embraced DPU technology. By the 1970s, independent control of remote locomotives was possible and Southern Railway began experimenting with multiple remote consists. After Harris Corp. acquired Radiation, Inc. in 1967, Locotrol™ II was introduced, with smaller hardware installed in the locomotive cab and short hood. Locotrol™ III followed and was compatible with Wabtec's EPIC and New York Air Brake's CCB electronic brake systems. With the introduction of Distributed Power™, GE heralded a technology that could handle multiple remote consists, a feature increasingly used today.

While locomotives are assembled on virtually every continent, North American designs have been the preferred heavy-haul motive power. Not only have American locomotives set the standard for rugged, dependable, pulling power, but they have paved the way for new technology. As a result, locomotives from EMD, now Progress Rail, and GE Transportation, now Wabtec, continue to offer unrivaled value for their owners as far away as Africa, Australia, India, and numerous other Asian countries. T

DON GRAAB, a career railroad mechanical department manager, spent most of his time in locomotive maintenance-related areas. His railroad career spanned 39 years. Graab retired as Norfolk Southern vice president-mechanical, a post he held for half a decade.

The DRZ: Where CN and CPKC cooperate

Directional running in British Columbia keeps Canada's trade-based economy moving

by Bill Stephens

Canadian National intermodal train Q108 crosses the Thompson River at Black Canyon as westbound Canadian Pacific coal load 867-247 approaches the double track and CN connection at Nepa, British Columbia, on Aug. 26, 2019. A.J. Shewan


MAERSK
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msc
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MAERSK

Canadian National C44-9W No. 2525 and a BC Rail C44-9W bring coal drag 731 across the arched bridge over the Fraser River and the CP's Thompson Sub at Cisco, B.C., on Oct. 7, 2010. Tom Kline

On a dank September morning, Canadian Pacific Kansas City's Toronto-Vancouver intermodal hotshot train 101 rolls across Canadian National's steel arch bridge at Cisco, British Columbia, with the mighty Fraser River churning some 220 feet below.

Not 5 minutes later, an eastbound CN empty coal train roars out of the 595-foot Cisco Tunnel, crosses the Fraser on CPKC's three-span through truss bridge, and rumbles under the 12,800-foot No. 101, still making its way across the province's longest river.

The over-under meet at one of Canada's iconic railroad locations puts an exclamation point on 90 minutes of nearly non-stop action featuring grain, intermodal, coal, and merchandise trains in the CN-CPKC Directional Running Zone, or DRZ, as the railways call it.

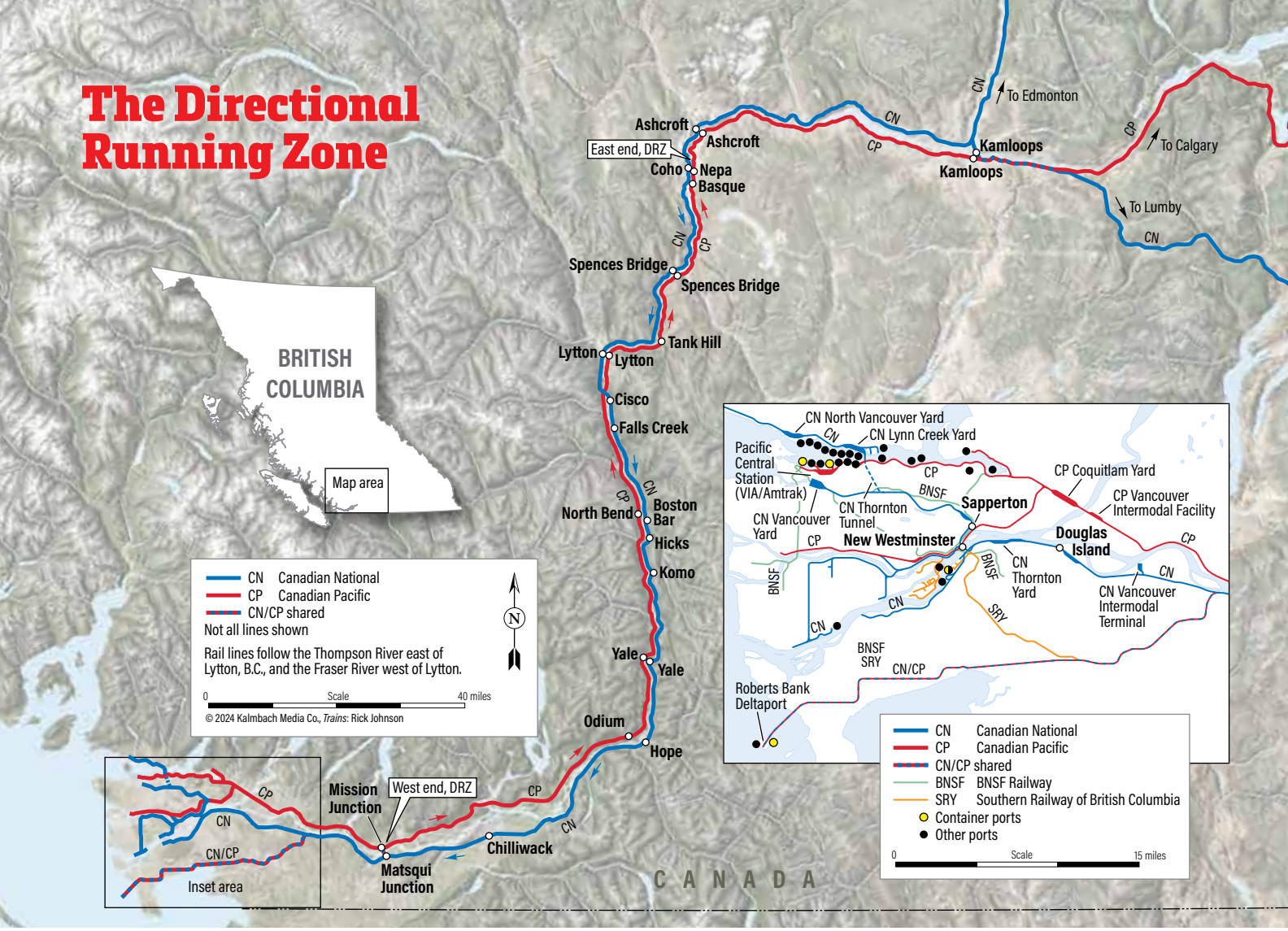
CN and CP have been archrivals for more than a century. They compete for customers every day, and in recent years they've feuded over executives, collided over interchange in Chicago, and waged an epic battle for the Kansas City Southern.

Yet for 24 years, they've been cooperating in the DRZ by sharing tracks for about 155 miles of the 235-mile corridor between Kamloops and Vancouver. "It's the right thing for the Canadian economy, it's the right thing for our customers, and it's the right thing for the railroads," says Derek Taylor, CN's executive vice president and chief field operations officer.

AC44CW No. 9818 leads an eastbound potash train on Canadian Pacific's Cascade Subdivision along the Fraser River at Yale, B.C., on June 9, 2019. A crew change in North Bend is less than 30 miles ahead. Matthew Robson

The sheer walls and fast-moving water of the Thompson and Fraser river canyons are formidable barriers to adding or extending passing sidings. By pairing their single-track mains and coordinating operations, CN and CPKC eliminated delays associated with meets — and aren't limited by passing-siding length. What the frenemies have created is a high-capacity, double-track route that keeps Canada's trade-based economy humming.

And it's a good thing they did. Without the DRZ and the overlapping coproduction



Highest Tonnage Multi-Commodity Main Lines in North America

Railroad	Route	Annual Gross Tonnage	Year	Trains Per Day	Year
Union Pacific	Overland Route, O'Fallons-Gibbons, Neb.	305 million*	2018	77	2019
Canadian National-CPKC	British Columbia Directional Running Zone	228 million**	2020	58	2023
BNSF Railway	Southern Transcon, Clovis-Vaughn, N.M.	189 million	2017	80	2017
Union Pacific	Overland Route, Cheyenne-Green River, Wyo.	140 million	2018	42	2019
CSX Transportation	Former B&O, Greenwich, Ohio-Chicago	113 million	2018	48	2019
Norfolk Southern	Chicago Line, Toledo, Ohio-Chicago	110 million	2018	75	2021

Source: Railroad density maps, railroad officials, STB filings

*307 million west of North Platte; 302 million east of North Platte.
**Based on figures CP reported for 2020; *Trains* estimate for total based on roughly even CN-CP tonnage split

area in Vancouver, neither railway could have handled the past two decades of phenomenal traffic growth fueled by trade with Asia. Since launching the DRZ in 2000, CN and CPKC have hauled a rising tide of bulk and merchandise traffic to export at Vancouver, as well as a surge in international container business to and from Canada's busiest port.

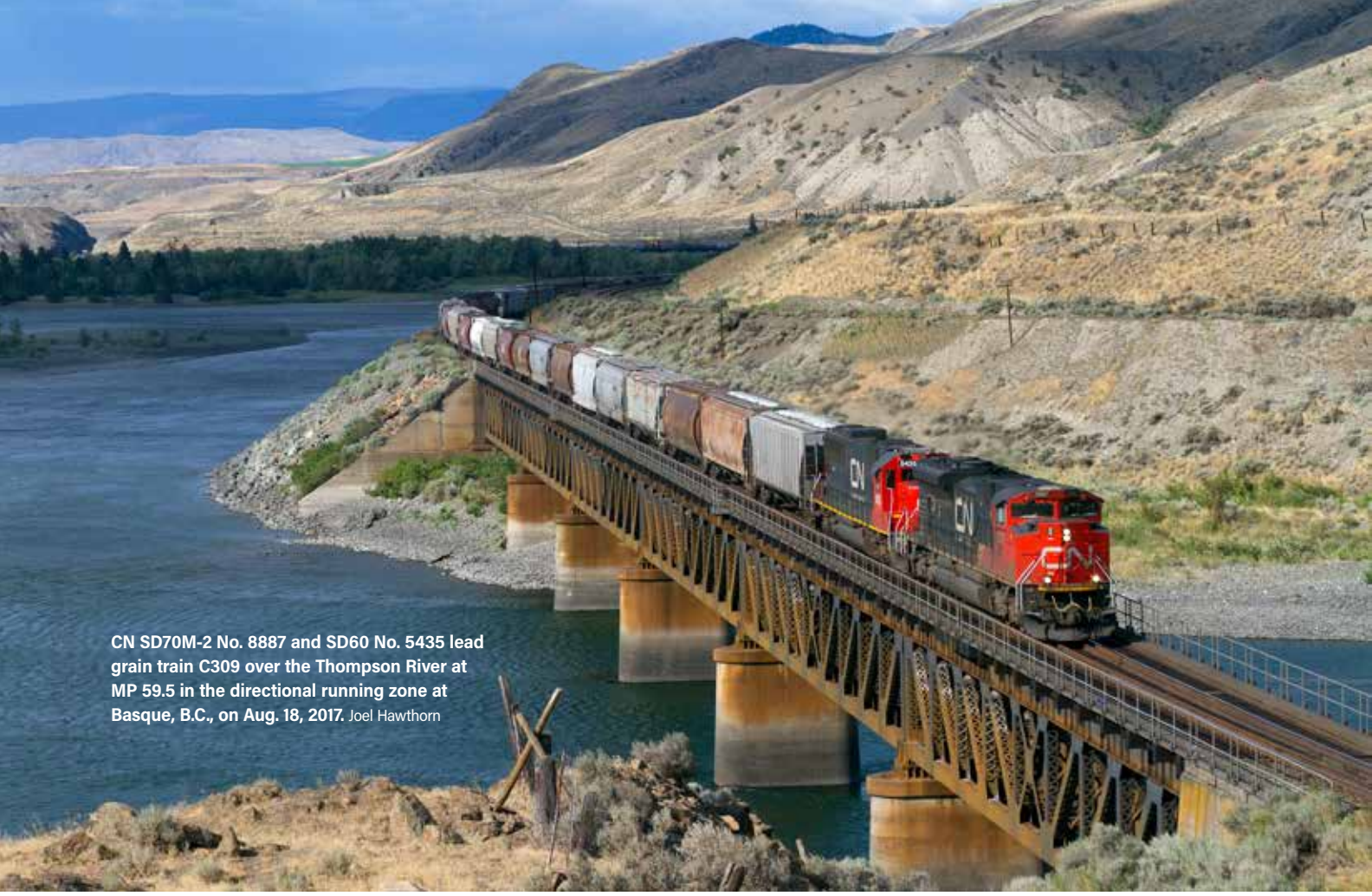
CN and CPKC sent an average of 58 trains per day through the DRZ in November 2023, according to RailState data, up from 48 or so per day back in 2000. But the 21% increase in daily train volume doesn't tell the whole story, because today's trains are far longer and heavier. In fact, when measured by tonnage, the DRZ now is the No. 2 multi-commodity main line in North America, trailing only Union Pacific's triple-track Overland Route across Nebraska.

That's right: The DRZ carries more tonnage than the continent's busiest main line, BNSF Railway's 80-plus-train-per-day Southern Transcon west of Clovis, N.M. And it handles twice the tonnage either CSX or Norfolk Southern funnel in and out of Chicago on their multiple-track main lines.

In the DRZ, CN and CPKC face numerous constant challenges. The heavy volume, rugged canyons, complex Vancouver terminal, and unpredictable weather are always a formula for challenging railroading.

An old idea gains traction

At the turn of the 21st century, directional running in the canyons was not a new idea. It had been suggested — and rejected — for decades. "Neither CN nor CP wanted to do it. There was 75 years of



CN SD70M-2 No. 8887 and SD60 No. 5435 lead grain train C309 over the Thompson River at MP 59.5 in the directional running zone at Basque, B.C., on Aug. 18, 2017. Joel Hawthorn

CN crews change trains on opposite sides of the Fraser River on Sept. 26, 2023. At left, a crewman climbs aboard a Vancouver-bound grain train at Boston Bar, B.C., on the CN; at right, a crew is dropped off at a train of grain empties at North Bend, B.C., on CPKC. Two photos, Bill Stephens

distrust, mistrust, fear that the other guy was going to get an advantage and so on," says Paul Miller, a now-retired CN executive who negotiated the complicated operations components of the DRZ agreement with his counterpart at CP, Mark Rickerby.

But in the mid 1990s, a Prairies transportation group wrote to then-CN CEO Paul Tellier to ask why the railroads weren't sharing operations to speed the flow of freight to the West Coast. Directional running, they said, just made so much sense. Tellier ordered CN operations officials in Edmonton to draft a response. Since neither they nor their CP counterparts wanted to proceed, they wrote a "kitchen sink" letter outlining all the reasons directional running couldn't be done.

Tellier signed the letter. But the open-minded CEO penned a note at the bottom. "He wrote on it in his distinctive handwriting words to this effect: Despite what I've written here, I'm instructing my officers to take another look at this," Miller recalls. When E. Hunter Harrison became chief operating officer in 1998, he thought directional running was a no-brainer.

The DRZ sprang from CN and CP coordination of engineering work blocks. Their old canyons management agreement permitted detours on each other's main lines when major projects were under way, such as bridge replacements. "If you choose not to coordinate and collaborate there, it will get you down the road because each railroad downstream in Vancouver is inter-

changing grain trains and potash trains and such. So if you choose to coordinate and collaborate through that whole zone then you have an excellent chance of keeping fluid," says Rickerby, who retired in 2015 as general manager of CP's operations in British Columbia.

The railways jointly planned and scheduled their canyons trackwork for all of 1999 and reached labor agreements so that train crews could operate on either main line. Then a working group was formed to explore permanent directional running.

At the time, both railways were beginning their longer-train strategies and were lengthening sidings east of Kamloops to handle trains that stretched up to 12,000 feet. Passing sidings through the Thompson and Fraser canyons were generally 6,400 feet long, and the inhospitable terrain made extending them prohibitively expensive.

CP chose the easier side of the rivers when it chiseled through the canyons, largely by hand, from 1883 to 1885. Canadian Northern came along 30 years later and had the advantage of mechanized equipment, but was forced to carve its railroad on the opposite — and far more challenging — riverbank. That put CN in more of a siding-extension pickle. But the incentive for creating the DRZ was for both railroads to avoid spending millions of loonies to blast new tunnels, build new bridges, and widen rights-of-way on their respective sides of the rivers.

When Miller and Rickerby first met to discuss operational aspects of the directional running zone, they laid all their cards on the table, found they had good chemistry, and within an hour had sketched out how to proceed. Their working relationship and spirit of cooperation set the tone for the rest of the negotiations.

The basic agreement was straightforward. The DRZ would begin at the railways' connection roughly 67 miles west of Kamloops, which CN calls Coho and is Nepa on CP. From there it would extend through the Thompson and Fraser canyons and out onto the broad plain of the Lower Mainland. Its western end would be at Matsqui Junction on CN and Mission Junction on CP, which are connected by the CP swing bridge over the Fraser. Crew changes would be at the division-point towns of Boston Bar on CN, and, across the Fraser, at North Bend on CP. The canyon agreement also spells out how to handle detours in the event that one main line is out of service, with volume apportioned based on each railroad's traffic levels from the previous months.

Thanks to its gentle grades of no more than 0.4%, CN's main line was selected to host westbound traffic, which consists primarily of heavy unit trains hauling coal, grain, potash, and sulphur, plus merchandise loads of lumber, pulp, chemicals, and fuels. Eastbound traffic, which includes the return of empty cars and unit trains along with relatively light loaded intermodal and automotive traffic, runs on CP's undulating main and its ascending grades of up to 1.5%.

CN and CP began testing directional running in November 1999 and never looked back. "We didn't stop the tests," Miller says. "We kept going."

The final DRZ agreement, signed in 2000, was a huge capacity boost. "You go from a network on each side that was maybe capable of 18 trains each way for each railroad. Now you could run them like streetcars," Rickerby says.

Directional running also meant trains were no longer constrained by siding length. Over time, coal trains went from 100 cars to 152, pushing length to just over 8,000 feet from 5,300. CN runs monster grain trains of 200 cars or more that stretch 11,000 feet, while CPKC operates 8,500-foot grain trains with at least 134 cars. And stack trains are generally in the 12,000-foot range.

In 2006 the railways layered on a coproduction agreement designed to simplify operations and reduce CN-CP interchange moves in and around Vancouver. Rather than hand off westbound traffic at Sapperton, New Westminster, and Vancouver, CN and CP exchange westbounds at Boston Bar. CN crews run both railways' trains to destinations on the CN-served North Shore of the Burrard Inlet. CP crews, meanwhile, handle both railways' trains bound for the South Shore, where it's the serving railroad. CP also operates both railways' coal trains between Boston Bar and the Westshore Terminals at Roberts Bank. The process works in reverse for eastbound trains, which are exchanged at North Bend.

Combined CN and CPKC Directional Running Zone Volume

Westbound	Average per day
Manifest	6.7
Intermodal	7.4
Grain	7.2
Coal	5.4
Potash	1.3
Petroleum	1.1
Other	1.5
Total	**30.6**
Eastbound	
Manifest	9.2
Intermodal	7.2
Grain	3.2
Coal	4.6
Potash	1.2
Petroleum	0.6
Other	1.1
Total	**27.1**
Total by railroad	
CN	30
CPKC	28

Source: RailState data for November 2023

Canadian Pacific AC4400CW No. 8529 leads a seemingly endless string of grain hoppers eastbound on CP's Thompson Subdivision along the Thompson River west of Spences Bridge, B.C., on Oct. 7, 2010. Tom Kline

Freshly painted AC4400CW No. 9835 leads CP potash train 603 through New Westminster, B.C., on Canadian National on Aug. 12, 2017. Keeping operations fluid in the Vancouver area takes extensive coordination between the two railroads' staffs, who can watch each others' dispatching moves. Corwin Doeksen

A growth enabler

Precise growth figures for the DRZ are hard to come by. But consider these stats:

First, from 2000 to 2020 revenue ton-miles in British Columbia doubled — far above the 37% overall growth in Canada, according to data from the Railway Association of Canada. (Yes, some of that B.C. increase came from the CN-served Port of Prince Rupert, which went from intermodal zero to hero after Rupert became a fast-growing container port in 2007.)

Second, total tonnage at the Port of Vancouver grew 28% between 2008 and 2022, according to the Vancouver Fraser Port Authority, which was created in 2008 from three separate port groups.

Third, over that period Vancouver export grain tonnage was up 46%, potash tonnage was up 35%, and exports of processed foods like vegetable oils grew 14%. Contributing to a lesser extent were exports of chemicals, metals, and minerals (+8%); metallurgical coal (+7%), and forest products (+1%).

Finally, container traffic at Vancouver nearly tripled, going from 1.23 million TEUs, or 20-foot equivalents, in 2000 to 3.57 million in 2022. Along the way, Vancouver landed business from U.S. West Coast ports and became a gateway to Chicago and the Midwest. Back in 2000, CP could only muster about 3,000 feet of container traffic per day out of Vancouver and would fill out train 198 with merchandise traffic. Now CPKC routinely originates three 12,000-foot stack trains from Vancouver every day, according to data from RailState, which tabulates train data collected from a network of sensors along rail lines.

All of this traffic bound to and from Vancouver has moved in ever-longer trains. The average train in Canada had 73 cars in 2000, according to RAC data. By 2021 the average had jumped to 121 cars — a 66% increase. Average train weight, meanwhile, grew 31% between 2011 and 2020.

Trade with Asia is the driving force behind the growth at Vancouver, which handled $305 billion worth of cargo last year. Simply put, Western Canadian natural resources are in demand in Asia, particularly in China, Japan, and South Korea. Some of the exported raw materials return to Vancouver in the form of automobiles, auto parts, and containers filled with consumer goods. And all of it depends on the railways, which nearly evenly split Vancouver port volume.

A link in the chain

Although the CP-CN rivalry dates to 1919, it has intensified in recent years and reached a crescendo in their 2021 tug-of-war to acquire KCS. Executives frequently traded barbs during the seesaw four-month battle to create the first railroad linking Canada, the United States, and Mexico. After CP won, CN still raised a ruckus with regulators, even seeking a forced divestiture of the KCS line connecting Springfield, Ill., with Kansas City so it could create its own route linking Eastern Canada and Detroit with KC.

None of this corporate drama matters to the railroaders who keep the trains rolling through the canyons, out onto the Lower Mainland, and into Vancouver's tangle of trackage and waterfront terminals.

"While we are absolute competitors in Canada, we have to coexist in that region. What is best for Canada and best for both railways is this DRZ, coupled with the co-production agreement that has allowed us to expand the GTMs and allow us to grow by 30% to 40% for both railways," says Greg Squires, CPKC's senior vice president of western operations.

Taylor, who was CN's Vancouver-based general superintendent of operations from 2009 to 2012, says the DRZ and "co-pro" area works smoothly without any friction between the railways. "Make no mistake: While we compete for volume going into Vancouver, of course, we also work very closely together to make sure it remains a fluid rail terminal," he says.

Coordination is key. "It's nonstop, 24 hours a day," Squires says.

And managing Vancouver — with its scattered 29 rail-served marine terminals,

pinch points like the New Westminster swing bridge, and interchange with BNSF Railway and Southern Railway of British Columbia — is no small task. CN's main facility is Thornton Yard, which sprawls along the Fraser's south bank. Across the river and 2 miles to the northeast sits CPKC's Coquitlam Yard. Both classify cars bound for customers in Vancouver and serve as holding tanks for unit trains awaiting their turn at port terminals or to head back to their origins in Western Canada.

"You can start right in Vancouver, with both operating teams, CPKC and CN, multiple times a day on conference calls discussing which trains are coming in, what we're spotting, what we're pulling, when we're getting our cars back from the North Shore, when we're spotting at the South Shore for CN," Squires says. "Then you move it to our OCs, our Calgary operations center, multiple times a day with theirs. Which trains are ready to go? We have got to feather them in at Mission and then we feather them in at Nepa."

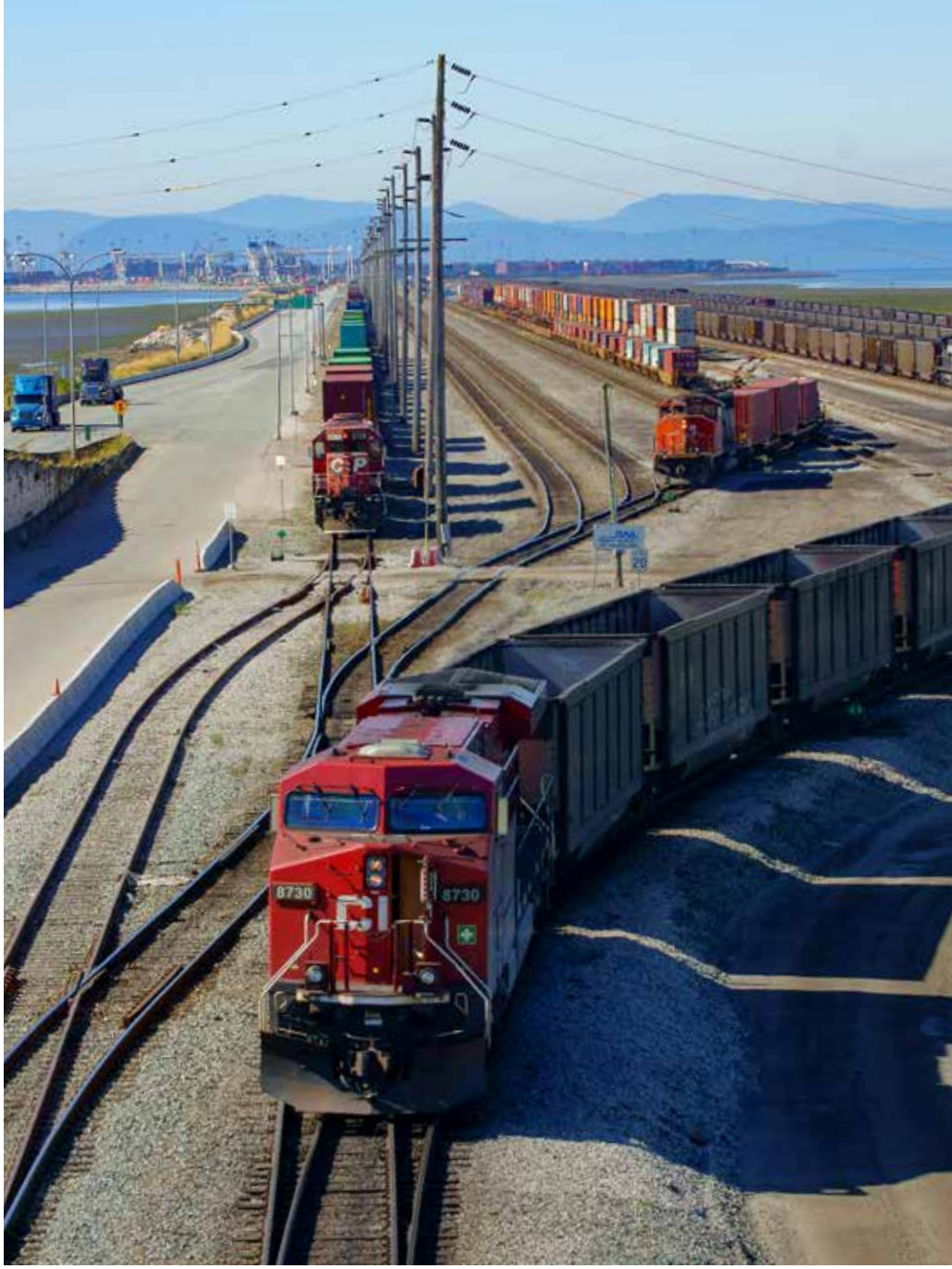
Both railroads also can peer over the fence and see what their neighbor is up to. "We share our central control systems, so on my computer I've got two screens," Squires says. "One's theirs and one's ours, so I can see what's coming in and see where mine are as well. I can look at what's coming out of Thornton and what's coming into Kamloops."

Keeping Vancouver fluid takes the entire supply chain — mines, Prairie elevators, 22 bulk terminals, four on-dock container terminals, ocean vessels, and railways — working together. "The toughest thing that we've got is managing the supply chain," Squires says.

Vancouver sees rain on a majority of days for five months out of the year. Amazingly, the port's grain terminals can't load ships when it's raining. And that can create a backlog that forces the railways to stage unit trains at their yards in Vancouver, Boston Bar, Kamloops, and beyond.

CN and CPKC cooperation alone isn't enough to keep Vancouver fluid. "While the DRZ's very successful, the supply chain is what makes it all work," Taylor says.

Shippers, terminal operators, and the railroads have made capacity investments to support ongoing growth. Among the more than $2 billion invested over the past few years: Expansions at the Centerm, Vanterm, Fraser Surrey, and Deltaport dockside intermodal terminals; expansion of Neptune's coal and potash capacity; grain expansions at the Fibreco, Cargill, and Richardson, and Fraser Surrey terminals, plus a massive new G3 grain terminal. Meanwhile, the provincial and federal governments have approved plans for a new dockside intermodal terminal at Roberts Bank.



CP ES44AC No. 8730 moves empty coal gondolas past waiting coal trains as it leaves Roberts Bank, B.C., and heads onto the Roberts Bank Rail Corridor on Sept. 6, 2011. CPKC, CN, and BNSF all serve the coal and intermodal terminals at Roberts Bank. Radford Bean

CN's recent projects include upgrading the ventilation system in the 10,000-foot Thornton Tunnel, which increases throughput to and from the North Shore by allowing trains to proceed through the tunnel every 5 to 10 minutes, down from the prior 20-minute interval between trains. In a related move, CN added a third track between Thornton Yard and Thornton Tunnel. The 18,900-foot siding allows CN to stage trains closer to the tunnel rather than at Thornton Yard.

CN also added a 12,000-foot signaled bypass around Thornton Yard and built 6,000 feet of yard trackage. Coming next: The 3.7-mile Glen Valley double-track project, which will eliminate the last section of single main track between Matsqui and Thornton Yard.

CPKC, which completed a round of expansion projects in 2017 and since has added transload centers and an auto compound, has additional passing sidings on the drawing board. "The best thing that we can do, though, is move the traffic faster," Squires says. "If we move it faster, we create our own capacity. And we've still got room to grow there."

In the canyons

At daybreak on CN's Yale Subdivision, you watch the tail end of a potash train crawl across the curved steel Anderson River trestle, 2 miles timetable west of

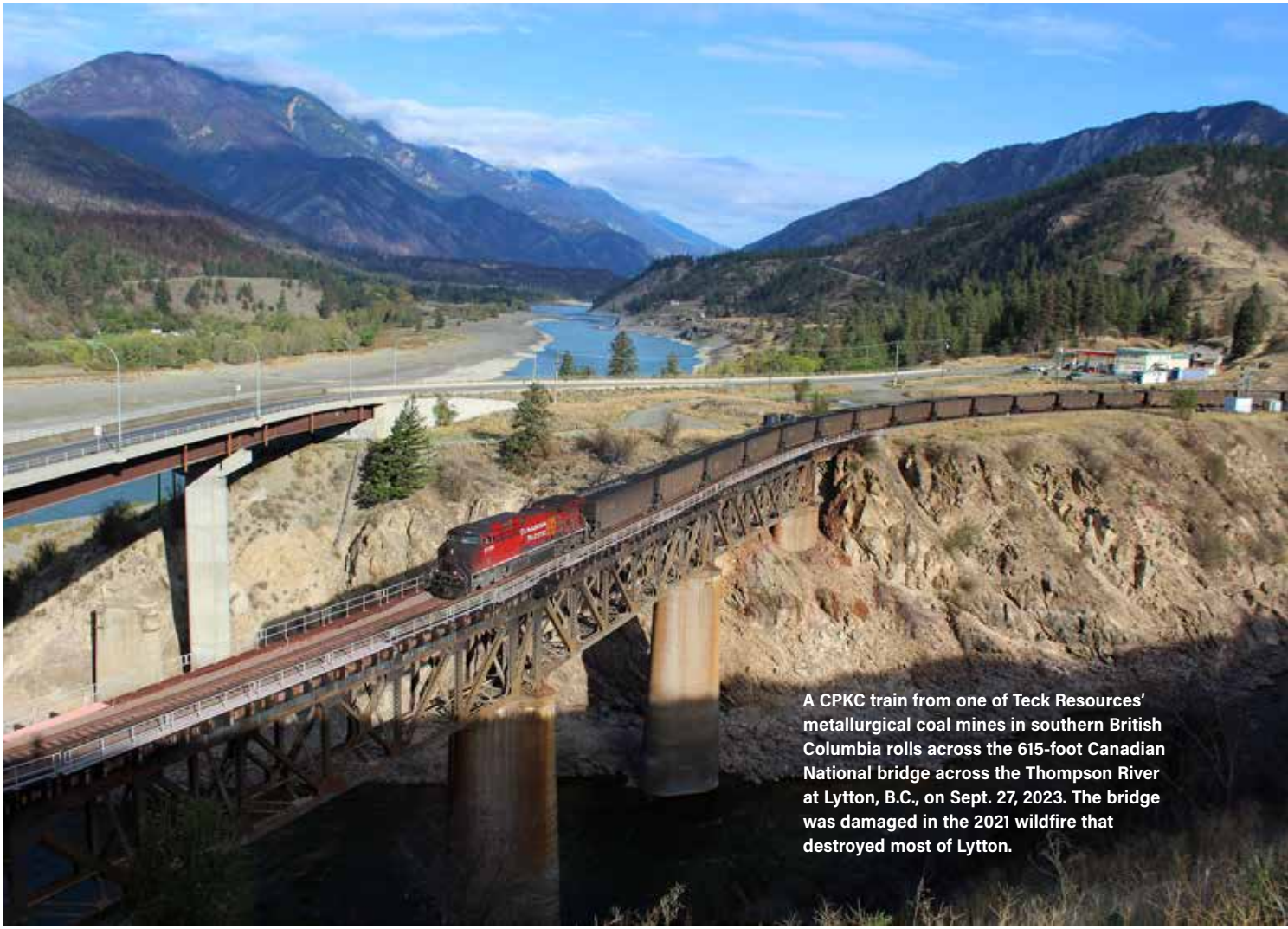
Canadian Pacific Kansas City intermodal train No. 149 from Bensenville, Ill., to the Roberts Bank, B.C., terminal, crosses the Anderson River trestle 2 miles west of Boston Bar on Sept. 26, 2023. Three photos, Bill Stephens

Slides are an issue throughout the DRZ, as is made clear as a westbound Canadian National potash train passes slide fences at a scarred hillside in the Thompson River Canyon east of Lytton, B.C., on Sept. 27, 2023.

Boston Bar. The crew lets the rail traffic controller in CN's Network Operations Center in Edmonton know the slide detector signal has been activated between Hicks and Komo. They get the OK to proceed at the maximum allowable 10 mph.

Right on its heels: CPKC stack train No. 149, with a CP AC4400CWM up front and KCS AC4400CW as the midtrain distributed power unit. With the hazard warning system signal still active, the 149 tiptoes across the 914-foot span, too. Neither train crew sees anything amiss, but a hi-rail truck is dispatched to take a closer look.

Gravity is always the enemy of mountain railroads. But here in the Fraser and Thompson river canyons, grades aren't the problem. Instead, trouble looms high above the tracks. Gravity is constantly tugging on rock that Mother Nature pries loose from the canyon walls, particularly during freeze-thaw cycles in the spring



A CPKC train from one of Teck Resources' metallurgical coal mines in southern British Columbia rolls across the 615-foot Canadian National bridge across the Thompson River at Lytton, B.C., on Sept. 27, 2023. The bridge was damaged in the 2021 wildfire that destroyed most of Lytton.

and fall. Says Justin Meyer, CPKC's senior vice president of mechanical and engineering: "Rock falls is one area both railways are concerned about. What's happening above us?"

What indeed. You peer down on a pair of CN ES44ACs leading a 200-car potash train in the White Canyon just east of Lytton. Twin scars run down the mountainside and end at a pair of slide fences beside the main. After the rear end ET44AC distributed power unit rounds the bend into Wrexham Tunnel, you hear a curious sound. But what? It turns out that vibration from the passing train set off a cascade of small rocks and sent them tumbling over the edge of the slide, where they fall harmlessly into a pile next to the tracks. "Our slide fences work. … Our predecessors found out where to put them for a good reason," Meyer says. "And they really do protect us."

The multiple rock/snow sheds and the multitude of wayside detectors guarding the DRZ — miles of slide fences, plus alarms to warn of high water, high winds, washouts, and derailments — say a lot about how challenging the 155.3 miles on CPKC and 156.2 miles on CN can be. "Challenging would be an understatement," Taylor says.

The subdivisions that comprise the DRZ are as rugged as they come. They include CN's Ashcroft Sub (Kamloops-Coho-Boston Bar) and Yale Sub (Boston Bar-Matsqui-Douglas Island) and CPKC's Thompson Sub (Kamloops-Nepa-North Bend) and Cascade Sub (North Bend-Mission-Vancouver).

From Kamloops until it exits the Cascade Mountains at Hope, CN's main includes 15 tunnels and eight rock sheds/slide chutes on the Ashcroft Sub, plus 16 tunnels on a 26-mile stretch of the Yale Sub. CPKC's Thompson Sub runs through 10 tunnels, while its Cascade Sub features 14 bores.

Both systems keep heavy equipment and supplies at strategic locations in order to respond to slides and avalanches. Sparse highway access makes it difficult to reach problem areas. "You can only access about 10% of our railroad in the canyons by road," Taylor says. The rest must be reached by helicopter or hi-rail vehicle.

With such heavy volume, any glitch in the canyons quickly causes headaches. "When we have an issue on either one of those single tracks in the DRZ, it's twofold," Squires says. "Now you're trying to get equipment in, and there's not a lot of access. You've got the river right there, and you've got the mountain beside you. There's always 15 to 20 trains in each direction … when the first one stops, it's just a big domino effect. It's tough to get crews off that train. We have an issue with train one and now you're trying to get the guys off of train five safely and get them re-crewed. It's challenging."

CN and CPKC take every proactive step they can to prevent slides, including removal of loose or potential unstable rocks, slope stabilization projects, and regular inspections by helicopter.

Sometimes there is no escape from Mother Nature's wrath. The British Columbia wildfire season has grown more intense in the past five years, with bigger and more frequent fires disrupting the railways, damaging track and bridges, and leaving miles of forest blackened along the main lines.

A Royal Canadian Pacific excursion train exits Jackass Mountain Tunnel on CN trackage on Sept. 5, 2010. This area was hit yard by flooding in November 2021, with more than 60 washouts. Steve Glischinski

The town of Lytton, which sits at the confluence of the Thompson and Fraser rivers, was almost completely destroyed by a wildfire that began on June 30, 2021, and killed two residents. It took CN 13 days to repair fire damage to its 615-foot bridge over the Thompson River. Lytton remains a ghost town, with crosswalks leading to rubble-strewn lots on either side of Main Street.

CN and CPKC now field firefighting trains. CN's Poseidon fire train will get reinforcements this year with the arrival of matching trains dubbed Neptune and Triton. They can be run individually or as a larger, more powerful apparatus. "We're learning to resource appropriately to help not just the railroad, but to help the communities and the environments which we operate in," Meyer says.

Wildfires leave the ground charred, barren, and unable to absorb water. In essence, one 2021 disaster in the canyons set the stage for another.

Fire and rain

The weather forecast leading up to Nov. 14, 2021, included ominous warnings about an atmospheric river that would lash British Columbia with waves of rain. CN and CP prepared for a repeat of catastrophic January 2019 storms and washouts.

The Pineapple Express downpours began as predicted. When the weather cleared two days later, some two months' worth of rain had fallen, measuring anywhere from 8 inches to nearly a foot in Hope, B.C. Making matters worse: High temperatures melted the snowpack of the high peaks, adding yet another month's worth of precipitation in the canyons. Damage from the deluge was unprecedented.

Jackass Peak, named for the mule trains bound for the Cariboo gold fields in the rush of 1858, towers 6,000 feet above milepost 110.5 of CN's Ashcroft Subdivision. Tributaries from the mountain feed Falls Creek Falls, which plunges 331 feet in four tiers right above the Trans-Canada Highway and, a couple hundred feet below, the CN main. Both were in the way. The raging waters took them out, blowing a hole in the main line that was 200 feet wide and 200 feet deep.

In all, CN and CP were hit with more than 60 washouts in the canyons. Two more atmospheric rivers only exacerbated the monumental task of putting their main lines back in service.

With the highway out, both railways attacked the damage from Kamloops and Vancouver, repairing as they went. "There were 30 locations on the western corridor, with 20 of those that were significant, significant events that needed to be rebuilt,"

A westbound Canadian National container train led by C44-9W No. 2569 follows the Thompson River near MP 74 on CN's Ashcroft Subdivision as it approaches Spences Bridge, B.C., near the east end of the Directional Running Zone, on June 8, 2019. Matthew Robson

Squires says. "When we have an outage like that, we obviously get it back up and running as quick as we can because the nation's economy's at stake."

CP's main was restored in eight days, allowing some traffic to move in directional fleets. It was, CP CEO Keith Creel said, "a miraculous effort."

Thanks to a 400-person army of employees and contractors using more than 110 pieces of heavy equipment, CN reopened its main on the weekend of Nov. 27-28, but another storm dropped more than 5 inches of rain and set back recovery efforts. CN's main was returned to service on Dec. 4 after crews built a five-span, 219-foot bridge over Falls Creek.

CN's rebuilding efforts included moving 282,000 cubic yards of rock and soil, enough to fill 25,000 trucks, to washout locations.

Recovering from "the big one" is a credit to CN's people, Taylor says. "To be a railroader means something. There's a lot of lifestyle choices and sacrifices that come with that," he says. "But our folks are second to none, whether it's the engineering team, [or] the bridge and buildings teams. All those folks that came together to make that happen was nothing short of incredible."

Looking ahead

With climate change driving more frequent extreme weather, CN and CPKC are taking steps to harden their railways through the canyons. "When there is a disruption, we build something that's definitely more robust and more willing to take a 500-year storm," Taylor says.

An example: At Tank Hill, milepost 85 on the Thompson Sub, CPKC replaced a bridge that was lost and added another span to help prevent future washouts. Similar improvements are being made elsewhere in the canyons as the railways chip away at problem areas every year.

"It's going to be a challenge, though, not knowing exactly what climate change and what the changing world we live in holds for us tomorrow," Meyer says. "We've got to keep advancing and doing better each day."

To get advanced warning of weather events and trackside trouble, railways are partnering with weather forecasters and putting more technology to work. CPKC is relying on satellites to monitor changes in water levels at high-risk locations, for example, while one of CN's autonomous track inspection boxcars continuously cycles back and forth between Kamloops and Vancouver. The car's lasers measure changes in track geometry, and its cross-plane Lidar system monitors the right of way and creates maps of the canyons.

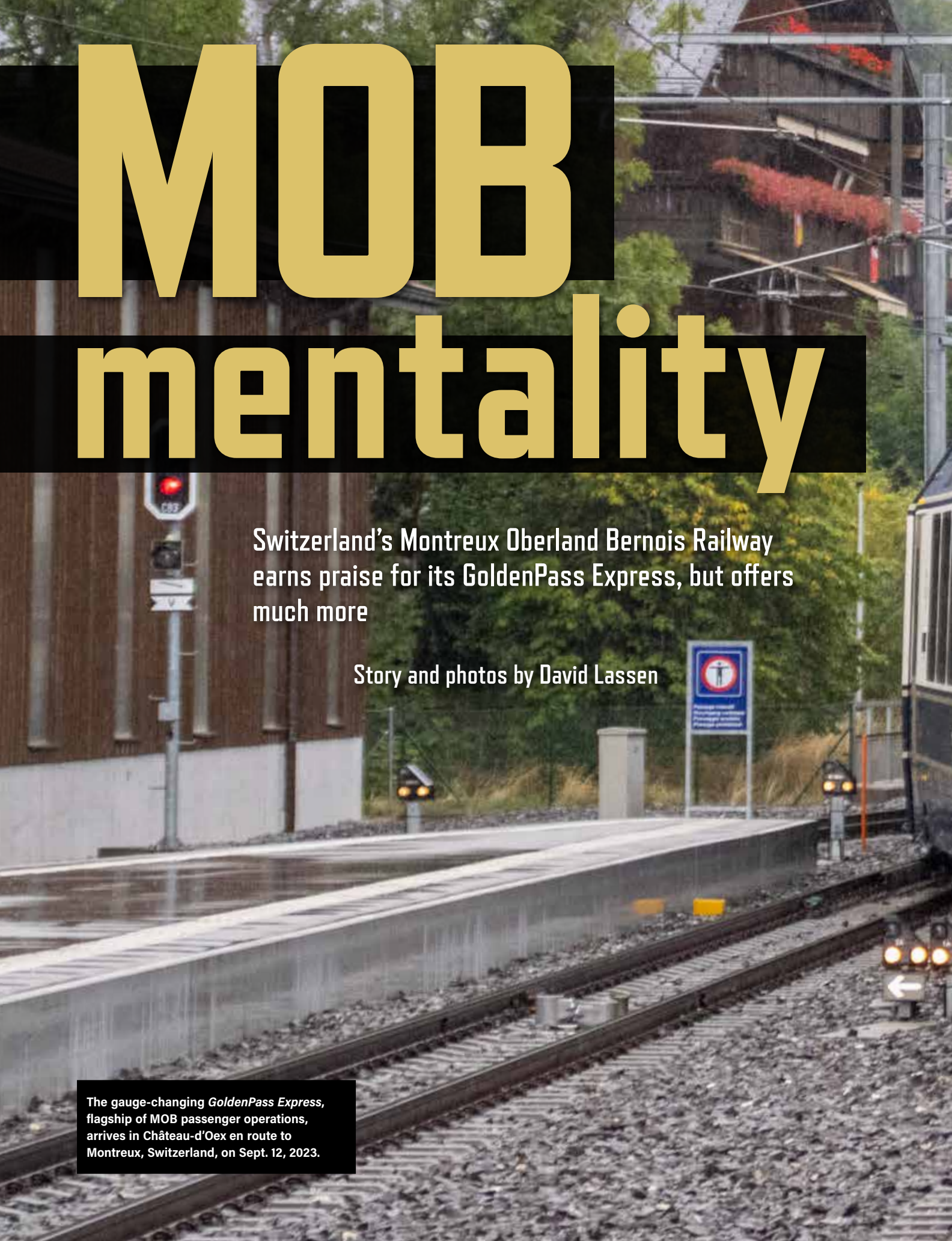
Whatever the weather may bring, the DRZ corridor has more freight heading its way. Prairie farmers continue to harvest larger grain crops. A new dual-served potash mine, set to open in Saskatchewan in 2026, may boost Canada's potash production by 22%. And in the Alberta Industrial Heartland northeast of Edmonton, petrochemical plants are cranking out more plastics, chemicals, and fuels.

CN and CPKC say they're ready to handle it. "I don't see a capacity issue in the coming years. I don't think that there's one limiting factor," Squires says. "The supply chain has to work: The beginning, the middle, the end. It all has to flow — and when it does we see record volumes going through the port." I

MOB mentality

Switzerland's Montreux Oberland Bernois Railway earns praise for its GoldenPass Express, but offers much more

Story and photos by David Lassen



The gauge-changing *GoldenPass Express*, flagship of MOB passenger operations, arrives in Château-d'Oex en route to Montreux, Switzerland, on Sept. 12, 2023.


GPX
C1
V

The company behind one of the most interesting technical accomplishments in recent railroading — as well as a train ride heralded by the world's travel press — has largely been overshadowed by the train it created.

Switzerland's Montreux Oberland Bernois Railway — originator and operator of the gauge-changing *GoldenPass Express* — can live with that.

"Being well-known isn't naturally all that important," says Frédéric Delachaux, MOB's director of marketing and sales. "We decided maybe 15 or 20 years ago to work for the products from their brand, GoldenPass. … MOB is the name of the company, but we are pushing more the name of the product."

Truth be told, MOB — the formal name, since it is in French-speaking Switzerland, is Compagnie du Chemin de fer Montreux Oberland Bernois, so we'll stick with the initials — is at least as fascinating as its celebrated train.

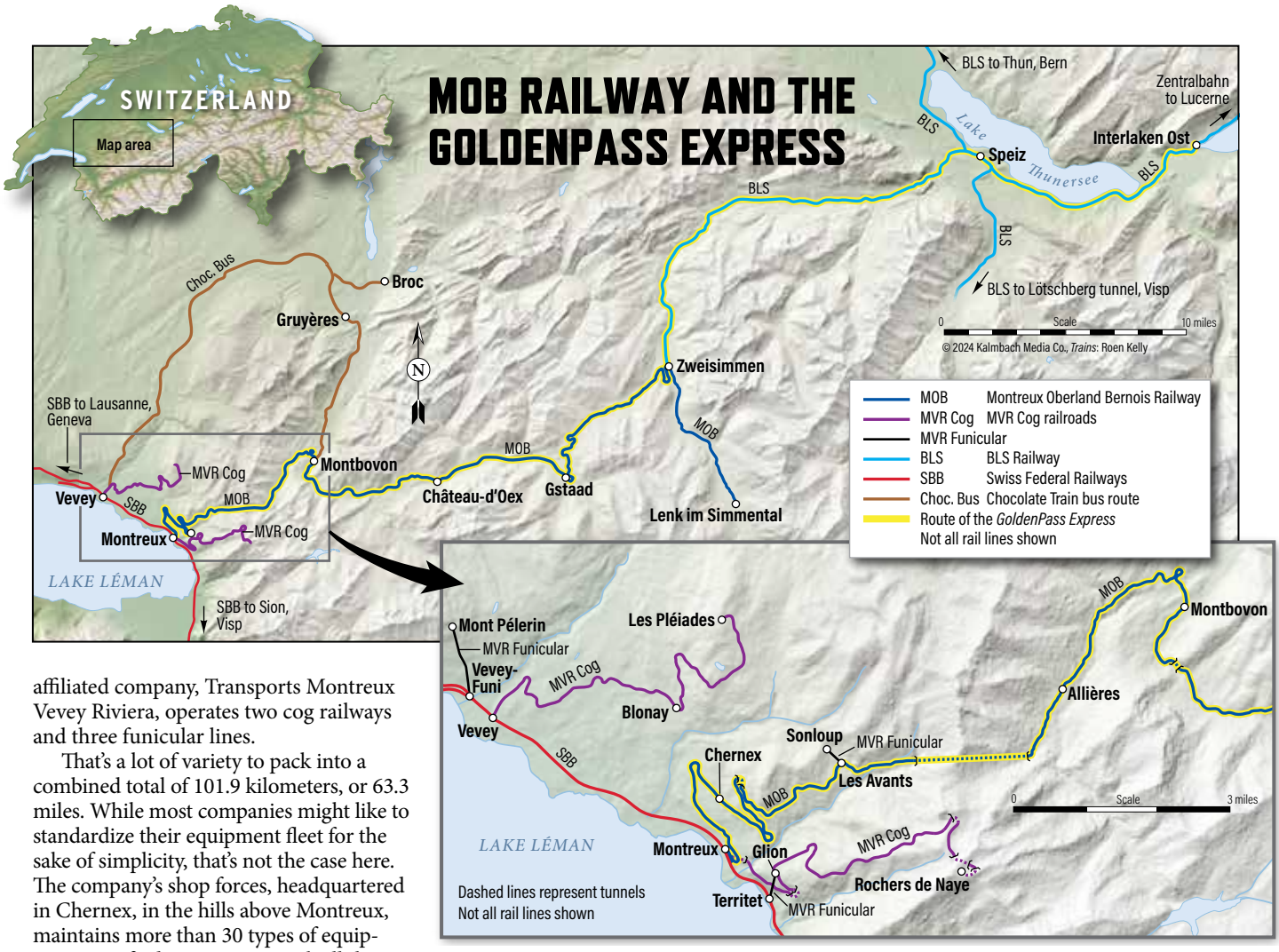
No doubt, the *GoldenPass Express* is a marvel. On its run between Interlaken and Montreux, it changes between meter and standard gauge, between the 900-volt and 15,000-volt power of its two host railroads, and for good measure adjusts car height to match the railroads' differing platforms. For those not interested in the technology, it provides a premium ride.

Frédéric Delachaux, MOB director of marketing and sales, talks with a group of travel writers as the *GoldenPass Express* changes engines in Zweisimmen.

But even without the *GoldenPass Express*, the railroad would be fascinating. Largely government owned (43.1% by the Swiss Confederation; 39.3% by the cantons of Bern, Vaud, and Fribourg; and 3.7% by Montreux), the meter-gauge line is one of the country's oldest electric railways. Its first section, between Montreux and Les Avants, opened in 1901. The 62.4-kilometer (38.8-mile) main line to Zweisimmen was completed in 1906, with a 12.9-kilometer (8-mile) branch to Lenk im Simmental opening in 1912. In 2022, it handled 2.65 million passengers, good for 37.97 million passenger-kilometers, about 24.7 million passenger-miles.

In addition to the *GoldenPass Express* (also promoted as GPX), those passengers are handled on a variety of conventional passenger equipment; a modern creation of 1920s-style equipment the company calls the "Belle Époque;" and GoldenPass Panorama equipment, which emphasizes the route's scenery. It also offers Chocolate Train and Cheese Train tourist operations, and is restoring two vintage passenger cars for future specialty use. Meanwhile, its

MOB's Belle Époque train, part of its Chocolate Train tourist package as well as regular service, makes the steep descent into the station in Montreux on a rainy Sept. 12, 2023. Montreux's station features trains of three gauges, two of them operated by MOB or affiliate MVR.



affiliated company, Transports Montreux Vevey Riviera, operates two cog railways and three funicular lines.

That's a lot of variety to pack into a combined total of 101.9 kilometers, or 63.3 miles. While most companies might like to standardize their equipment fleet for the sake of simplicity, that's not the case here. The company's shop forces, headquartered in Chernex, in the hills above Montreux, maintains more than 30 types of equipment. Just finding space to stock all the spare parts is a challenge.

But the company believes that the technical variety and challenges that come with such a multifaceted fleet is actually a drawing card for the people attracted to its engineering and maintenance teams — and that the *GoldenPass Express* proves the point: No problem is too difficult for MOB's people to ultimately find a solution.

GPX: The technology

MOB had set a goal of a single-seat ride for the 115.3 kilometers (71.6 miles) between Montreux and Interlaken for 120 years. The barrier was the 51.9 standard-gauge kilometers (32.2 miles) between Zweisimmen and Interlaken on what is now the BLS rail network (the Bern-Lötschberg-Simplon Railway today goes only by its initials). At one point, the planned solution was dual-gauge track, but that was thwarted by the complexity of the trackage at Speiz, where the route meets heavily used standard-gauge lines heading north toward Bern, the national capital, and south through the Lötschberg tunnel, a vital passenger and freight route.

So the company's engineering team developed the idea of a gauge-changing train.

One of the complex wheelsets for a *GoldenPass Express* car. The key to the technology is that the frame expands; wheels are on stub axles rather than two to an axle. MOB-GoldenPass

The *GoldenPass Express* runs through this section of track in Zweisimmen for its wheelsets to make the transition between standard and meter gauge. Keith Fender

The *GoldenPass Express* awaits departure from Interlaken. The control cab at this end of the train is set up for the specifications of standard-gauge railroad BLS.

"Everybody told them, this is not possible," Delachaux says. "There's no chance. But they continued to work on the project, and 15 years later, we're on this train with the new technology, which is the variable gauges."

There are variable-gauge trains elsewhere, but they make comparatively small adjustments, generally relying on telescoping axles. But the difference between standard and meter gauge — 435 millimeters, or 17.13 inches — is too great for that solution to be practical in this case. So the key here is that the truck's frame expands, not the axle. To greatly simplify: Think of each wheelset as connected, parallel sets of beams holding each wheel on a stub axle. In Zweisimmen, where the two gauges meet, the train runs through special equipment mounted in the track. There, the space between those wheels expands or contracts, electronically and hydraulically.

At the same time, the Alstom-built cars raise or lower by 35 centimeters, or 13.8 inches, to address the difference in platform height between the meter-gauge MOB stations and the standard-gauge BLS stations. For good measure, this is also where the train changes between 15,000- and 900-volt power.

"It's automatic," Delachaux says of the power conversion. "We just see the lights [flicker] and then it's okay."

All this happens while the train is in motion, and occurs so smoothly most passengers are probably unaware of it. Delachaux recommended standing up as our train rolled through if we wanted to feel the change; even then, there was only a slight sense of motion. The best way to appreciate what's happening is from a video shown on screens inside the cars.

The transition has generally worked flawlessly, although crews are always stand-

Big windows and big seats with a seemingly endless number of adjustments — including the ability to be turned to face the direction of travel — distinguish Prestige Class. MOB-GoldenPass

The good life: Champagne and an "Apero-Plate" in Prestige Class.

BIG PLANS
for a cog railway

Rebuild on tap for century-old Rochers de Naye line

Members of the 2023 *Trains* Magazine/Special Interest Tours "Majestic Switzerland" tour get a look at Lake Geneva from on board the Rochers de Naye cog railway.

THERE'S ALWAYS ANOTHER BIG PROJECT ahead for a company like the Montreux Oberland Bernois Railway, and the next one carries with it quite a responsibility.

The company is making plans to rebuild the rail line to Santa Claus' house.

The line in question is the Montreux-Rochers de Naye Railway, a cog line built to 800-millimeter (2-foot, 7½ inch) gauge. In 10.4 kilometers, or 6.5 miles, it climbs 5,177 feet to reach the summit station and restaurant at 6,473 feet (1,973 meters). From there, it is a short walk to the Rochers de Naye peak (6,699 feet/2,042 meters), with "a stunning view, available only by train" of Lake Geneva, says Frédéric Delachaux, MOB's director of marketing and sales.

For eleven months of the year, this is your basic Swiss cog railway — an engineering marvel with marvelous views. (That is true en route even if the top is obscured by clouds, as was the case during a visit with a *Trains* Magazine/Special Interest Tours group in September 2023.)

But from late November until Christmas Eve, it becomes the route to The House of Santa Claus (or — depending on the customs in your specific corner of multilingual, multicultural Switzerland — La Maison du Père Noël, Das Haus des Weihnachtsmanns, or La Casa di Babo Natale). More than 10,000 children visited in that month in 2022, according to a former company official.

Overall, the line handles about 140,000 passengers a year, about 55% of those commuters on the lower portion. The split between transportation and attraction is why the lower portion of the line, between Montreux and Haut de Caux, is free for international visitors with a Swiss Travel Pass; from there to the summit, the pass is good for a 50% discount, as is the case on most services that exist primarily for tourism.

Technically, the line is not part of MOB, but of Transports Montreux-Vevey-Riviera, or MVR, which also operates another cog railway and three funicular lines [see page 35]. MVR has its own board of directors and equipment, but no employees; it is managed and operated by MOB, which owns 19.9%. Various governmental entities own 50.2%; others, mainly private individuals, own the remainder.

The Rochers de Naye line, with a maximum grade of 22%, was built by two companies that remained separate for most of a century. The top part, from a funicular station in Glion to Rochers de Naye, was built first, covering 7.7 kilometers (4.8 miles). It opened in 1892 and was electrified in 1938. The gap between Montreux and Glion was closed by the 2.8-kilometer Montreux-Glion railway, which opened in 1909 and was electrified from its inception. The company operating the top portion, the Compagnie du Chemin de fer de Glion aux Rochers de Naye, took over the lower part, as well as the Glion-Territet funicular, in 1992. That company became part of MVR in 2001.

A Rochers de Naye train emerges from a tunnel at the Montreux station, completing its 5,177-foot descent in 6.5 miles. Planning is underway to rebuild the line.

Like MOB's main line, the line uses 900-volt power, and — as with MOB — that is a limiting factor in operations. It's one of many things to be improved in the planned rebuilding.

"Some parts of the track are original," notes Delachaux, who says the rebuilding cost will be in "the hundreds of millions" of francs. (As of Jan. 1, a Swiss franc is worth $1.19). "We are addressing more than 100 years of constant use."

The plan is to upgrade the electrical system to 1,500 volts. This will allow the use of newer, heavier, and faster equipment. "Now it's 55 minutes to go to the top," Delachaux says, "and the goal is to be around 40 minutes going up, then maybe 35, 40 minutes going down."

A faster trip could become more of an attraction, drawing from a large area, given the proximity to Montreux and major travel routes, the company believes.

"It's the first mountain from the Geneva airport," Delachaux says. "We're directly connected from Milano as well to Interlaken. So, in our long-term strategy, Rochers de Naye is a key to develop. ... A group [could] start in Interlaken, go to Montreux, go up to Rochers de Naye, go back to Montreux, and then continue their trip." The company believes annual ridership could be boosted to 300,000.

Project planning is under way; construction is likely to begin in 2028. If nothing else, that's a reminder of how the construction process has changed across the world.

"When they build the line in the late 1800s, they finished the restaurant [at the top] before the train arrived," Delachaux says. "The very interesting fact is that they built the restaurant in 17 weeks, only with horses. Seventeen weeks." He laughs.

"Now, it's a minimum of five years just to plan." — *David Lassen*

The *GoldenPass Express* trainset was slated to add a fifth car in April. Tobias Ryser for MOB

Big windows, spacious seats, and a wood-grain look distinguish the first-class compartment on the *GoldenPass Express*. The train has 48 first-class seats.

ing by just in case. One December day in 2022, a piece of ice covered a sensor on one of the trucks and halted the operation.

"It's a learning process," Delachaux says. "Every day we are learning new things about the train, about the electronics and the works." The section of track where the transition takes place is heated; eventually, it will likely be covered, as well, but the company wants to ensure it is satisfied with the setup before building a roof.

The train debuted in mid-December 2022 [see "Swiss introduce gauge-changing train ...," "Technology," April 2023]. For all the care that went into development, it sustained a setback shortly after introduction when BLS noticed unusual rail wear on some switches. The equipment was limited to the MOB portion of the route between February and June 2023 while the issue was addressed. The solution was, literally, tiny: the distance between the wheelsets was reduced by a few millimeters, decreasing the potential for lateral movement and track wear.

The ability to fix the problem by adjusting the existing equipment, rather than a change requiring new parts, was crucial to a quick restoration of full service.

"We went through a homologation process," Delachaux says, "and it was very complicated … because this is a train running on a meter track, and at the same time, it's a train running on a normal track." Since no government standards exist for such a hybrid, the train essentially had to go through separate approval processes to meet both meter-gauge and standard-gauge qualifications. Had the solution to the track-wear problem involved new parts, it would have required going back to the government for additional approval, "and that would maybe take additional months," he says. "Or it could take years.

"This is our problem when you have a big innovation like this. We are always facing some trouble. Even if you try to think of everything, there are always a few things."

GPX: The experience

While many who ride the *GoldenPass Express* will be oblivious to the technological marvels beneath their feet, they will certainly appreciate the creature comforts, particularly if their ticket is in Prestige Class.

There are 18 Prestige Class seats, nine at either end of the train in compartments immediately behind the cab-car controls. For reasons pertaining to moving the train through the gauge-changing equipment, the locomotive is always at the west end of the train on standard-gauge BLS and on the east end on meter-gauge MOB. So on each trip, one portion is run from the cab-car controls and the other portion from the locomotive; which portion depends on your direction of travel.

The Prestige seats — three rows in a two-and-one configuration — would be

hard to surpass. The wide leather seats are heated, offer a myriad of adjustments, have a huge amount of leg room (with leg rests), and can be turned to face the direction of travel — an unheard-of option in European rail travel. Delachaux says that in marketing surveys, customers' desire to be able to turn the seats came up "two times, and then two times again, and then more times … and we decided it was something important."

The first row of seats is adjacent to a large window providing a view into and through the control cab. These seats have their own fans: "They are always asking to be in those seats because they want to have the view along the tracks." Seat-specific ticketing is available online.

(One notable detail about those control cabs: they differ at each end. Since the train is never turned, the one at the westbound end is built to MOB specifications, since it is only used by MOB crews; the other is designed to the slightly different specifications of BLS.)

The floor in the Prestige Class section is also elevated by about 16 inches, compared to the rest of the train, to provide a slightly better view for the Prestige passengers.

At 3 hours, 15 minutes, the trip is not long enough for full-fledged dining service, but the onboard catering is first rate. (Disclaimer: My trip was part of a tour arranged by Switzerland Tourism; MOB rolled out the red carpet for us, so our "Apero-Plate" — bread, meat, cheese, and a glass of Champagne — was complimentary. It would normally cost 39 Swiss francs, or $44.35 at the exchange rate as this is written). Options range from a breakfast box for 12 francs to a caviar package with Champagne for 89 francs.

The most impressive and surprising thing about Prestige Class: it costs only an extra 49 francs, currently $55.72, compared to a regular ticket; that's 29 francs for Prestige Class itself and 20 francs for a seat reservation. When you figure you can, at this writing, pay $43 for a midday upgrade from coach to Business Class on an Amtrak *Northeast Regional* between New York and Philadelphia — or $114 to step up from Business to First Class on an Acela — it's clear the Prestige experience is not overpriced. You'll likely wish the trip was longer.

"We don't want this to be a luxury production," Delachaux says. "We would like to stay something affordable. This is very important to us. … We are a normal train with an exceptional enjoyment."

The biggest problem right now: Demand exceeds supply. There are four round trips a day, but the trains are not large, with just 145 seats, including 18 seats in Prestige Class and 48 in first class. In April, another second-class coach — also providing accessible accommodations — was slated to be added, increasing total capacity to 184 seats. (On the standard-gauge portion of the trip, there are 54 more second-class seats, thanks to an additional coach added between the locomotive and the *GoldenPass Express* trainset.)

Glorious views are one reason MOB features big windows not just on the *GoldenPass Express*, but on most of its passenger trains. Tobias Ryser for MOB

But the additional car will essentially maximize the capacity of each trainset, given the limited pulling power of the 900-volt locomotives on the meter gauge. Plus, Delachaux says, even if the train could be larger, it might not be a good idea.

"I always say this is a really little Swiss train," he says. "People love this. I don't think it would be as interesting for us to have a train with 10 carriages taking people in the mountains."

Chocolate and cheese

The *GoldenPass Express* is not MOB's only tourist-oriented venture. Food provides the framework for two others, the Chocolate Train and the Cheese Train.

The Chocolate Train runs at least three days a week from May to September (five days in July and August). It begins with a trip on the Belle Époque trainset — the modern equipment outfitted with the look and feel of a 1920s luxury train — from Montreux to Montbovon, about an hour away. There, passengers transfer to buses for visits to Gruyères, where Gruyère cheese is made (the town has an S at the end; the cheese does not), and Broc, home of Cailler chocolate — a brand sadly unavailable in the U.S. Return to Montreux is by bus. Initially, the whole outing was by train, but Delachaux says the day was simply too long. Now, the train departs at 9:50 a.m.; the bus returns at 5:15 p.m.

The Chocolate Train has been running for "10 or 15 years," Delachaux says. "At

First class on the Belle Époque train. The modern equipment, used in regular service, evokes the look and feel of a luxury train from the 1920s.

The short but scenic Vevey-Les Pléiades railway, remote from other MOB rail lines, is part adhesion and part cog railway. MOB-GoldenPass

MOB's other operations

ALONG WITH THE 46.8 MILES of the Montreux Oberland Bernois Railway itself and the 6.5-mile Rochers de Naye cog railway, MOB operates four other unique operations through its Transports Montreux-Vevey-Riviera affiliate:

- The Vevey-Les Pléiades cog railway. This 10.5-kilometer (6.5 mile) meter-gauge railway — part adhesion and part cog — is, like the Vevey funicular, remote from the other operations. The line climbs 962 meters, or 3,156 feet, with maximum grades of 20% for the 4.8-kilometer (3-mile) cog portion between Blonay and Les Pléiades. The summit station is at 4,423 feet. The Vevey-Blonay portion, along with a line to Chamby now used by a heritage railway, opened in 1902; the Blonay-Les Pléiades section opened in 1911. Electrified from the beginning, it uses the same 900-volt power as MOB's primary operation. A trip takes 38 minutes one way.
- The Vevey-Mont Pèlerin funicular. The longest of the company's three funicular lines, all meter gauge, this 1,580-meter line climbs some 415 meters (1,362 feet) and has four intermediate stops, an unusually high number. The line opened in 1900 and has a maximum grade of 54%. It underwent a 8.5 million franc ($10.1 million) renovation in 2014. A trip takes about 11 minutes. The Swiss Federal Railways' indispensable SBB Mobile app indicates tickets are available from 2.90 francs, about $3.30 — yes, the SBB app includes funiculars, with schedules and travel times. Of course, if you're using a Swiss Travel Pass, the funiculars are included.
- The Territet-Glion funicular. The oldest member of the MOB/MVR family, this 640-meter-long (2,100-foot) line climbs 301 meters (with a maximum grade of 57% opened in 1883. It was powered by water ballast — water was added to a tank in the car at the upper station; when that car became heavier than the car at the lower station, it moved downhill and pulled up the other car. Amazingly, this lasted until September 1974, when the system was converted to electric power. (Even more amazingly, there is one Swiss funicular, in Fribourg, that still runs this way.) The funicular's Glion station connects to the Rochers de Naye cog railway. A trip takes about 4 minutes.
- The Les Avants-Sonloup funicular. Opened in 1910, this 532-meter (1,745-foot) line connects the Les Avants station on MOB's main line to Sonloup, once the site of a popular hotel. The line climbs 597 feet with a maximum grade of 54%. A ticket is 2.70 francs, or $3.07. A Swiss funicular website (standseilbahnen.ch) says the operation, largely true to its original construction, is mostly used for access to a toboggan run in winter; in 2014, 13,500 of the line's 17,600 passengers were sledders. — *David Lassen*

A train prepares to depart Château-d'Oex, destination for MOB's Cheese Train excursions. The village also features a museum of hot-air ballooning.

the beginning, it was a very small project, and then there was a big explosion when the Indian market started to go." While it remains popular with travelers from India, it has also seen an influx of Swiss since the COVID-19 pandemic, as well as a general increase among Europeans. "American, not that much," he says. "It's difficult for us to sell packages to American people. Usually they buy Montreux-Interlaken with the seat reservation."

The Cheese Train offers more scheduling flexibility than the once-a-day Chocolate Train. It runs four days a week, 11 months a year (taking a break in November) with three departures each day from Zweisimmen or Montreux to Château-d'Oex, a small town roughly midway between the two. It features a look at cheese-making and fondue, a visit to museum of ballooning (the town hosts an international hot-air balloon festival each January), and a museum of paper-cutting art.

Delachaux says the company would like to expand the Cheese Train and offer it from Interlaken. "I definitely think there is a good combination. Paper-cutting is not that well known, but if you look around, there is always paper-cutting in Switzerland, so I think that could be something interesting for the Swiss market, the German market, the French market."

The tourist (and railfan) appeal of MOB operations extends beyond the *GoldenPass Express* or the two food-oriented trains. Some "regular" trains in Montreux-Zweisimmen service are the GoldenPass Panoramic trains. These feature larger windows (and an additional row of windows along the roofline), and unobstructed driver's-view seating at the front, since the actual driver has an elevated position. And the Belle Époque train, with its modern take on classic equipment, is its own

The *GoldenPass Express* arrives in Montreux while a Belle Époque train — which features a vintage look inside and out — awaits its departure on Sept. 12, 2023.

One of MOB's Panoramic trainsets, which provide a driver's view in the front row by moving the actual driver above the seating area.

attraction, although it operates in regular service with no additional ticket charge. (Either a Panoramic or Belle Époque train runs each hour).

Delachaux says there are passengers who prefer the Belle Époque train to the *GoldenPass Express* because they find the gauge-changing train "too modern" — and in fact, the company is considering a gauge-changing Belle Époque train to serve the full Montreux-Interlaken route.

That interest in classic equipment also has the company restoring two 1920-era wooden cars, relics of the *Golden Mountain Pullman Express,* an *Orient Express* offshoot that operated between Montreux and Zweisimmen until it fell victim to the Great Depression. The company sold off most of the equipment but retained two cars, which it used occasionally — they were the original rolling stock for the Chocolate Train — until age caught up with them. Now, they are being restored to their original condition.

"We are going to invest 1.2 million [francs]," Delachaux says. "It's very expensive. Everything is wood inside. They are original." The completed equipment will provide the basis for a new, nostalgic operation, which could begin this year or in 2025. Its exact nature has yet to be determined.

"The Belle Époque is running every day, so it is, for us, a normal train," he says. "We would like to make a new offer, for weekends or vacation, for people who want to go to Gstaad, or to the end of the line and come back."

Meanwhile, as the company contemplates new products, one old challenge remains. The original, grand dream for passenger service was to offer a single train between Montreux and Lucerne. The nature of Swiss railways being what it is, that would require more than just continuing past the current eastern terminus. The meter-gauge line between Interlaken and Lucerne is operated by yet another company, Zentralbahn. That's not a problem; the problem is that its 74-kilometer (46-mile) route between Interlaken and Lucerne includes three distinct sections of cog railway, with grades up to 12%. A *GoldenPass Express* that could run to Lucerne would need to add cogwheel mechanisms to the already complex gauge-changing wheelsets.

Even as talented as the MOB and Alstom technicians are, don't expect them to tackle that dizzying prospect any time soon.

"This challenge," Delachaux says, "I think we will leave to the next generation." 1

Perils of a road foreman

On the Lehigh Valley, you do what is asked or get abolished

by James Lathrop, as told to Guy Kinney

AS A YOUNG ENGINEER, age 38, I was appointed road foreman of engines on the Lehigh Valley Railroad working out of Sayre, Pa. My territory ran from Coxton, Pa., to Manchester, N.Y., which is half way to Buffalo, N.Y. It was in 1953 and the job lasted until 1955 when I was fired — I mean my position was abolished!

As a life-long railroader — entirely on the Lehigh Valley — I basically had one job and worked for one company, except for the two years driving a taxi in Auburn, N.Y., at age 19. I started in 1936 as a hostler in the Auburn yard on the branch bearing that city's name. In 1944, I was appointed engineer, spending most of my time on the branch. Apparently, because of my young age, the management recognized me as having promotion potential, and so in February 1953, I became a road foreman of engines.

This entailed moving to the Sayre office — in the big passenger depot — and working on the main line. I wore a suit, white shirt, and tie, had an office and a secretary. It was a great job and I felt I was on my way. Most of my responsibilities were tied to riding the engines on various runs and instructing both engineers and firemen on the proper handling of diesel locomotives.

Early on, however, I faced much resentment from crews since they were mostly older and more experienced. Many resented "a kid" telling them what to do. Compounding this was the fact I had spent almost my whole career thus far on the Auburn Branch, not the main line. Even my secretary said everyone believed the job should have gone to a "mainline man," adding he should have been considered for the promotion.

In 1953 handling a diesel-powered train was still relatively new. The Lehigh Valley sent me to the Electro-Motive Division plant in La Grange, Ill., for school where I learned F-unit basics. Many of the old timers were unfamiliar with handling long freights with up to four diesel units and the concomitant problems involved in starting, stopping, tractive effort, and braking. I had learned the basics and was expected to help them, despite some uncomfortable moments.

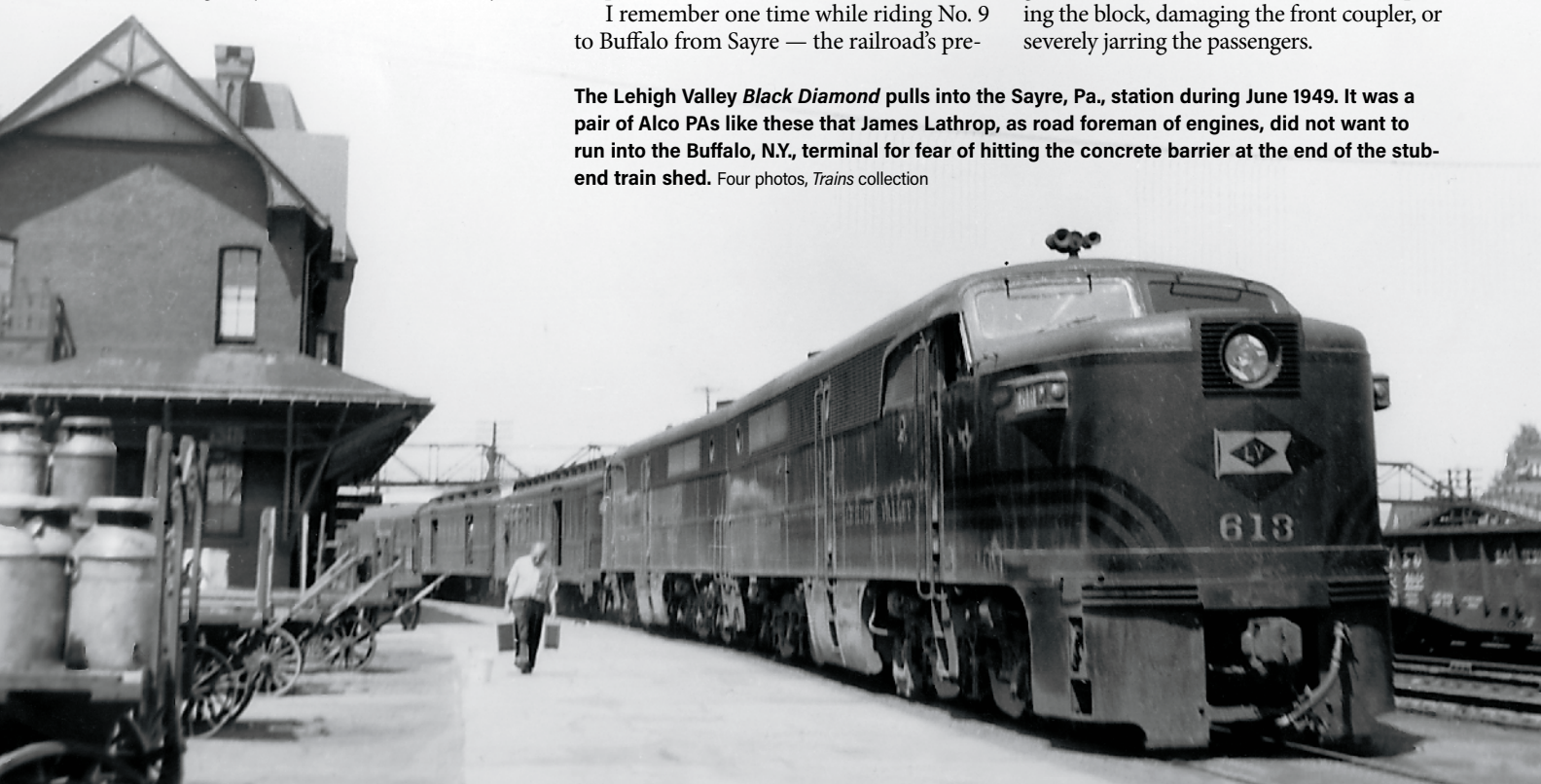
I remember one time while riding No. 9 to Buffalo from Sayre — the railroad's premier passenger train, the *Black Diamond* — Jim Lantz, who retired in 1955, was the engineer with two Alco PAs, each packing 2,000 hp. These engines were used on all passenger trains, with EMD and Baldwin diesels assigned to freights. Even though I was in charge, Lantz thought he had enough years to be assertive, and was! I was riding in the brakeman's seat, when suddenly he said, "Get your ass over here and run this thing instead of just sitting there."

I ran the train, making all the stops until I got to Batavia, N.Y., about 55 miles east of Buffalo, when I turned to Lantz saying, "You take over from here."

"You're afraid of the terminal, aren't you?" was his reply, referring to the upcoming Buffalo station.

"You're damn right I am."

The station in Buffalo had a train shed with stub-end tracks. One had to bring the train right up to the end and stop just short of a big concrete block guarding the end of the track. Being unfamiliar with the passenger units, I was not about to chance bumping the block, damaging the front coupler, or severely jarring the passengers.



The Lehigh Valley *Black Diamond* pulls into the Sayre, Pa., station during June 1949. It was a pair of Alco PAs like these that James Lathrop, as road foreman of engines, did not want to run into the Buffalo, N.Y., terminal for fear of hitting the concrete barrier at the end of the stub-end train shed. Four photos, *Trains* collection

Road Foreman of Engines James Lathrop dressed in his suit, white shirt, and tie.

The Lehigh Valley Railroad's facilities in Sayre, Pa. The passenger depot, location of Lathrop's office as road foreman of engines, is on the left side of the tracks, between the two bridges in the middle of the photo. Date unknown.

The new position was fulfilling. It felt as if I was on my way up the management ladder when my downfall began in 1955.

Aside from the tourist aspects of Niagara Falls, N.Y., there are chemical plants, oil storage tanks, and other industries. To service these companies, the Erie, New York Central, and Lehigh Valley partnered with the Niagara Junction Railway. This local, electrified switching line was owned equally by the parent companies but was run independently with its own operating rules.

The Niagara Junction Railway was formed in 1898 as a subsidiary of the Niagara Falls Hydraulic Power & Manufacturing Co. The Erie, New York Central, and Lehigh Valley acquired it in 1948. The Niagara Junction Railway was dissolved as a company when Conrail took over in 1976.

In spring 1955 the Brotherhood of Locomotive Engineers on the Niagara Junction went on strike. The parent railroads, in an effort to keep the line running, as well as to teach the engineers a lesson, decided to use their own crews for switching.

Since all available engine crews on the Lehigh Valley were occupied, some of us management personnel were sent to the Niagara Junction. Not being privy to what was going on, I and a few other road foreman were instructed to take the morning train to Buffalo — No. 11, the *Star*. From my division, Vic Cole and I were dispatched.

The next day there was a meeting with the superintendent, C.W. Baker, who later became Lehigh Valley president for a few months in 1960. We were informed that the company wanted us to go up to the Falls in two days and run the engines. That night Vic and I headed back to Sayre, taking one of the Lackawanna's trains. We wanted to get home earlier than the Lehigh Valley trains would allow. As we were eating in the dining car, Vic asked, "Jim, what are we going to do?" I told him I just couldn't cross the picket line, I wouldn't do it.

"I knew you wouldn't, me neither," he stated. We informed Mr. Baker of this fact.

Two days later each of us received a letter from Superintendent Baker indicating our jobs had been abolished. The Lehigh Valley didn't usually fire people. They merely abolished their position. In my case, Mr. Baker wrote, "Jim, this is the second time we asked you to do something for us and you refused." The first incident, according to the letter, was when an engineer from Buffalo had an affair with another woman, and I was to speak to him about it. This was the early 1950s and marriage was a contract for life. I had told Baker I couldn't interfere with another man's personal life. The railroad did not see my point of view.

After reading my letter, I walked right over to the crew dispatcher's office and marked up for the next day's Binghamton job! I still had my rights and seniority as an engineer. When I told my wife, she exclaimed, "Thank the Lord! Now no more calls at 2 in the morning to go to some derailment." I went back to my previous job and loved every minute of it.

My pride was hurt, but I was resolved not to let my fellow union guys down. I remembered my grandfather, also a Lehigh Valley engineer, who crossed the picket line once and paid for it for the rest of his career from the other men.

Vic Cole was so hurt that he suffered a nervous breakdown and needed professional help. He didn't have much seniority and could only hold a fireman's job on a Sayre yard engine.

Sometime later, I had just finished an evening run and was walking to the station when another engineer by the name of McIntosh stopped me. He came over, wrapped his big Irish arms around me, giving me a bear hug. "Jim," he said, "we knew you wouldn't cross the picket line. We knew you wouldn't let us down." Being respected like that meant more to me than anything! I shall never forget his big bear hug.

Years after C.W. Baker became railroad president and Vic Cole had recovered, Vic would tell people, "Yeah, I got fired, but it took the president of the railroad to do it." T

JAMES LATHROP and GUY KINNEY became friends during the later years of Lathrop's life. The two would chat, with Lathrop relating stories of his adventures on the Lehigh Valley Railroad. Lathrop related this story at age 99. He died at age 100 in 2015.

By the 1970s, Northeastern U.S. railroads were in financial trouble. The solution — Conrail — was a few years off. Meanwhile, railroads like the Lehigh Valley struggled to operate with bad track due to deferred maintenance. In 1970, Lehigh Valley train No. SM-1, with Jim Lathrop as engineer, hit some bad track east of Dryden, N.Y., dumping three boxcars and the caboose. Locomotive No. 218, an Alco RS2, stayed on the rails.

Detroit's Michigan Central Station to reopen June 6

Revival as an innovation center replaces 30 years of decay

▲ After a six-year renovation reported to cost more than $740 million, the Michigan Central, as it is now called, is scheduled to open June 6. The 18-story depot, which went into service Dec. 26, 1913, will serve as an innovation and event center. Lead partners in the project are Ford Motor Co. and Google. Two photos, Stephen McGee, Michigan Central

THE LANDMARK MICHIGAN CENTRAL STATION, purchased by Ford Motor Co. in 2018, will have its public reopening on June 6. Now 36 years after the last train left the station on Jan. 5, 1988, the 18-story building has been renovated to serve as a technology innovation and event center, according to Michigan Central, the name adopted for the new facility.

In February, the renovated Michigan Central's opening was cryptically announced by projecting a date onto the 18-story office tower. The event was confirmed within a week by media announcements.

First teased with the projection of the June 6 date on the side of the building, the opening was confirmed by the Ford subsidiary overseeing the building project in a statement: "We know Detroit and the world are eager to see how we've brought Michigan Central Station back to life. We are excited to show the first glimpse of the station on June 6, 2024, as we open its doors once again. Stay tuned to michigancentral.com and on our social media channels for more details."

Nearly 25 partner organizations have joined the Michigan Central program. Ford, a founding partner along with Google, plans to explore the next generation of transportation in all forms through its work at the center. Google will provide data management for the entire 30-acre campus and bring its Code Next coding education program to Michigan through the facility.

The 18-story building in the city's Corktown neighborhood opened in 1913. The station was designed by the same architects as New York's Grand Central Terminal: Warren & Wetmore and Reed & Stem. When opened, Michigan Central was heralded as the world's tallest train station and Detroit's tallest building. During its peak period — the two decades after opening — more than 200 trains and 4,000 passengers called on the facility daily.

The station has been undergoing a lengthy renovation since purchase by Ford [see "New life for Detroit's Michigan Central Station," *Trains* News Wire, June 11, 2018], reportedly for $90 million.

As of early 2022 — when it was announced Google would become part of the campus — renovation costs were reported to have reached $740 million [see "Google joins Michigan Central Station project," *Trains* News Wire, Feb. 4, 2022].

By comparison, the Michigan Central invested $16.7 million in the depot campus in 1913. That is equal to $519.7 million today. — Trains *staff*

In the June issue

Colorado comeback

After fires, avalanches, and mudslides, the Durango & Silverton has **BATTLED BACK** from adversity. Will America's **LAST CARNIVAL TRAIN**, sidelined since 2019, ever get back on track? A collection of **STUNNING PHOTOGRAPHY** explores the deep connections between communities and the railroad. **PLUS:** News, the latest in Preservation, expert Commentary, rail travel tips, and more.

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Last chance to ride Amfleet

The cars that saved Amtrak near retirement

AS AMTRAK'S AMFLEET approaches a half-century of service, the fleet's planned replacement is on order. Knowing this has stirred a well of nostalgia for the old cars. I grew up with Amfleet: these cars were introduced when I was in elementary school. Although at the time the technological significance of the new cars eluded me, I was impressed by their novelty. Over the years, I've taken countless trips aboard Amfleet cars, some of which count among my most memorable Amtrak travels.

The innovative Amfleet design was introduced at a time when American intercity rail travel was both under scrutiny and in jeopardy. The success of these cars should be studied and emulated. In the words of one Amtrak operating official, "Amfleet came out of the 1970s energy crisis. While they have served long past their life expectancy, we owe these cars a lot — they saved Amtrak."

Amfleet was the final legacy of the Budd Co.'s influence on long-distance passenger rail transportation that began in earnest in the mid-1930s with the introduction of the diesel-powered, streamlined stainless-steel Burlington *Zephyr*. Amfleet was the adaptation of Budd's Metroliner high speed train of the 1960s into a standardized locomotive-hauled passenger car.

The name "Amfleet" was coined by the marketing genius of Needham, Harper & Steers and perfectly described the role of the new cars. It was a significant design that offered many advantages over Amtrak's inherited cars.

Amfleet introduced head-end power, enabling Amtrak to phase out antique steam heating arrangements that helped overcome the complications and limitations of integrating equipment with different standards that had been inherited from the myriad railroad fleets. Amfleet employed a crash-resistant tubular design and Budd's patented shot-welded stainless steel construction that has proven to be exceptionally durable.

The cars combined well-designed trucks with a low center of gravity for excellent passenger comfort. The wider body offered more interior space and featured reclining seats with retractable tray tables. Electrically operated exterior doors made for rapid loading at high-level platforms.

The variety of car types included the Amcoach, Amcafe, Amclub, and Amdinette. Collectively they became known colloquially as 'Am-cans' — an allusion to the rounded stainless-steel shape.

The cars complied with loading gauge restrictions that allowed them to operate across the North American network. While innovative, Amfleet avoided overly complex or high-maintenance technologies such as tilting mechanisms, articulation, ultra-lightweight construction, or wheels with stand-alone single axles, all of which have caused the downfall of various advanced passenger car designs of the early years.

As a young train rider, I was nostalgic for the variety of rolling antiques that characterized Amtrak's early passenger fleet. Yet the Amfleet was modern. The cars exhibited bold 1970s décor that emphasized

▲ Amfleet cars have been the standard long-distance equipment on many eastern Amtrak trains for decades. On Dec. 29, 2018, No. 57, the Washington, D.C.-bound *Vermonter,* slows for its station stop at Windsor Locks, Conn. Brian Solomon

The interior view of an Amcoach assigned to the *Carolinian* displays pastel shades following a mid-life makeover. Two photos, Brian Solomon

A single Electro-Motive Division F40PH powers Amfleet-equipped Amtrak train No. 647 at CP44W near Worcester, Mass., on Dec. 29, 1988.

burgundy and burnt orange colors and track lighting. The feature that really caught my attention was the large rectangular electric buttons to open the doors between cars. Especially cool were the low-mounted foot panels that facilitated door opening with a swift kick. For a child, this was a huge improvement over struggling with the heavy metal doors and awkward handles of older cars.

On trips aboard Northeast Corridor trains between New Haven and New York City, my brother and I would explore the new cars as we hurtled along at speed.

Amfleet cars were decidedly Amtrak. The fleet was painted in Amtrak's patriotic livery from the beginning. In their early years, they were hauled by F40PH diesels outside electric territory, and behind E60 and GG1 electrics under wire. I thought the cars looked best hauled by the Swedish designed AEM7 electrics in their original red, white, blue, and platinum mist livery. The exceptionally compact size of the AEM7 was an interesting contrast to the length of the Amfleet cars.

Furthermore, the limitations of their HEP electrical supply required pairs of AEM7s on consists longer than nine cars, which resulted in some impressive double-headed trains.

Time is running out for these classics, yet as of this writing there are still 435 Amfleet cars in service, most of them in the East. They remain the staple on Amtrak's *Northeast Regional*, *Empire Service*, *Keystone*, and *Downeaster* trains, as well as on a host of longer distance trains such as the *Carolinian*, *Pennsylvanian*, and *Vermonter*. Since their glory days, the cars have received interior makeovers with a modern color scheme featuring pastels and greys.

What will become of the Amfleet as new Siemens Mobility "Aero" cars enter service beginning in 2026?

The Amfleet swan song is a few years down the line, so now is a perfect time to experience these classics on the move. My hope is that a set of eight or more cars will be preserved in full working condition so that future generations can experience the cars generations of Amtrak passengers relied upon for half a century. — *Brian Solomon*

RAILROAD ATTRACTION DIRECTORY

STEP BACK IN TIME to experience the golden age of railroading. North America's railroad museums and tourist lines provide affordable fun for the whole family! Plan your complete vacation with visits to these leading attractions. For information on advertising in this section, call Michael Wieloch at 262-798-6625.

CALIFORNIA — **Perris**

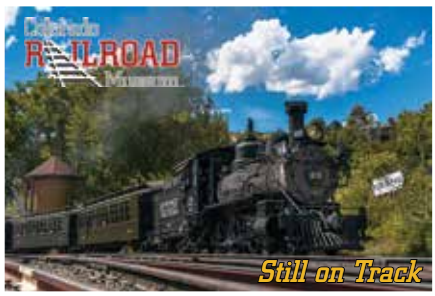
SOUTHERN CALIFORNIA RAILWAY MUSEUM
2201 South A Street

The Southern California Railway Museum is home to vast collections of historic and vintage railway equipment and artifacts.

www.socalrailway.org **951-943-3020**

COLORADO — **Golden**

COLORADO RAILROAD MUSEUM
17155 W 44th Avenue



Colorado has a rich railroading heritage. We're "Still On Track" with that heritage at the Colorado Railroad Museum, one of the top 10 railroad museums in the U.S. See dozens of locomotives, passenger and freight cars, and more, including both narrow gauge and standard gauge. Open Tues-Sun with changing exhibits, HO and garden railway layouts, special events, and train rides most Saturdays with expanded summer dates (visit website for schedule).

ColoradoRailroadMuseum.org **303-279-4591**

COLORADO — **Georgetown**

GEORGETOWN LOOP RAILROAD
646 Loop Drive

Ride the Rockies with the Georgetown Loop Railroad March 30, 2024 - January 7, 2025.
Enjoy a step back in time with our steam engines. Add a mine tour with gold panning.
Our Special Events include: Wild West Days, Mother's, Father's, and Grandparent's Days,
Autumn and Pumpkin Fests, Fall Colors, and our famed Holiday Trains in November and December.

www.georgetownlooprr.com **1-888-456-6777**

COLORADO — **Leadville**

LEADVILLE RAILROAD
326 East 7th

Open year around. Check our website for train schedules and upcoming specials. **NEW** this year holiday specials for friends and family. Raft and rail and zip and rail packages. Check out the website for updates on schedules, restrictions, and fun in the Rockies!

www.leadvillerailroad.com **1-866-386-3936**

KANSAS — **Abilene**

ABILENE & SMOKY VALLEY RAILROAD
200 SW 5th Street

We will move you in 2024!! Season Mid-April through December. "Smoky Valley Limited" Dinner trains; "Konza" Excursion Trains; Special 80th Anniversary D-Day trains; October Pumpkin Patch Trains; November/December Santa Trains. Private Charters too!! Find us on Facebook. Close to I-70. email: info@asvrr.org

asvrr.org **785-263-0118 or 785-263-1077**

KENTUCKY — **New Haven**

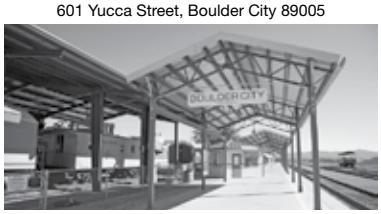
KENTUCKY RAILWAY MUSEUM
136 S. Main St.

Take a nostalgic trip aboard L&N's historic Lebanon Branch. Choose from 1.5 hour train ride to Boston or a shorter 45 minute ride to Gethsemane. Stroll through the museum that includes railroad artifacts and memorabilia. The Whistle Stop Gift Shop has everything for the train enthusiast.

www.kyrail.org **800-272-0152**

NEVADA — **Boulder City**

NEVADA STATE RAILROAD MUSEUM
601 Yucca Street, Boulder City 89005



The Nevada State Railroad Museum, Boulder City, is a showcase of the regional railroad lines that built Hoover Dam and other indelible parts of Southern Nevada. Visitors can experience railroading through train rides, exhibits, and learning opportunities. For more information, visit boulderrailroadmuseum.org.

boulderrailroadmuseum.org **702-486-5933**

NEVADA — **Carson City**

NEVADA STATE RAILROAD MUSEUM
2180 South Carson Street, Carson City 89701

The Nevada State Railroad Museum, Carson City, is a cultural resource dedicated to educating the community about Nevada railroad history. The museum contains an extensive collection of significant locomotives, rolling stock, artifacts, photographs, and memorabilia. In addition to static exhibits, select pieces of equipment in the collection are restored and operated throughout the year to demonstrate steam and early gasoline technology and provide visitors with an immersive experience. For more information, visit carsonrailroadmuseum.org.

carsonrailroadmuseum.org **775-687-6953**

OHIO — **Cincinnati**

A RAILROAD-THEMED BED & BREAKFAST!
517 Glenrose Ave, Arlington Heights (Cincinnati) Ohio, 45215

Arlington Station B&B

A 3-bedroom home with full kitchen and backyard deck. Many NS and CSX trains run on the ex-NYC double tracks across the street.

Near I-75 Exit 10 (Reading & Galbraith Roads).

Dherbert53@aol.com **Dean Carroll, Text to: 513-300-6931**

OHIO — **Cincinnati**

EnterTRAINment Junction
7379 Squire Court

Visit the World's Largest Indoor G-Scale Train Display with over 90 trains running in a huge 25,000sf display and learn about how the U.S. was changed by the railroads in the American Railroad Museum. There's even a train themed play area for the kids. Open 10 – 6 Monday thru Saturday & Noon - 6 on Sundays.

enterTRAINmentjunction.com **513-898-8000**

OREGON — **Elgin**

EAGLE CAP EXCURSION TRAIN
300 Depot Street

Go where cars can't take you! Follow the shores of the Grande Ronde and Wallowa Rivers in beautiful Northeast Oregon. Choose a standard Two Rivers or the longer Minam Bonus, or be on the lookout for bandits on horseback!

www.eaglecaptrainrides.com **541.437.3652**

PENNSYLVANIA — **Brownsville**

THE MONONGAHELA RAILWAY
412 Church Street

The Monongahela Railway was a coal hauling railroad in SW Pennsylvania & Northern West Virginia operating from 1900-1993. Visit our Museum and experience the MRY memorabilia on display. We have railroad photos, track charts, maps, tools, office equipment, a full sized speeder, and MRY caboose you can tour and Riverboat memorabilia & photos; plus a very large "G" scale train layout. Hours are 9:00am – noon Wednesdays and 10:00am – 2:00pm the first Saturday of each month.

E-mail: MRRandTM@gmail.com **724-880-5960**

PENNSYLVANIA — **Marysville**

BRIDGEVIEW BED & BREAKFAST
810 S. Main St.

At The Bridgeview B&B The action comes to you! Freight Trains are rolling in and out of Enola Yard right past our front porch. From the spacious decks and sitting room, you can watch the Susquehanna River, Blue Mountains and trains crossing World Famous Rockville Bridge, all in one spectacular panoramic view! Relax, in a comfortable, "home away from home" atmosphere at The Bridgeview, where we feature 10 clean, cozy rooms, all with private baths, A/C, WiFi, plus a freshly prepared breakfast to start your day! Visit Harrisburg, Hershey, Gettysburg, Adamstown and PA Dutch Country. See our website for more information, and give us a call. Come experience The Bridgeview Bed & Breakfast, where you never know, **what**, you might see next!!

www.bridgeviewbnb.com **717-957-2438**

PENNSYLVANIA — **Titusville**

OIL CREEK & TITUSVILLE RAILROAD
409 S. Perry St., Titusville, PA 16354

Ride the Rails! All aboard the OC&T for a journey through history and scenic beauty.

Regular Rides June - October

Many Special Events including Murder Mystery Dinners, Wine Tasting Train Rides, Christmas in July, Speeder Rides, Santa Trains & more.

Call or visit our website for complete schedule.

www.octrr.org **814-676-1733**

PENNSYLVANIA — **Washington**

PENNSYLVANIA TROLLEY MUSEUM
1 Electric Way

Take a ride into the past at the Pennsylvania Trolley Museum. Your visit begins at our new Welcome & Education Center that highlights the history of the trolley era through interactive exhibits, a museum store, and more. Take a ride on a beautifully restored antique trolley on our four-mile scenic track, visit the restored Wexford Station, and tour the Trolley Display Building that houses 22 of our streetcars. Fun for all ages! Parking is free, and we have a picnic area and a playground for children.

Hours: 10:00am to 4:00pm (last full experience begins at 3:00pm)
January-May: Friday through Sunday
June-August: Tuesday through Sunday
September-December: Friday through Sunday
Closed Mondays except Memorial Day, Labor Day, and during the Washington County Fair.

Adults $20
Seniors (ages 62+) $19
Children (3-18) $15
Toddler (2 and under) Free
Please visit our website for more information and special events pricing.

www.patrolley.org **724-228-9256**

SOUTH CAROLINA — **Greenwood**

THE RAILROAD HISTORICAL CENTER
908 South Main Street

Last Chance to See This Fabulous Historical Train this Year!

From the 1906 Baldwin Steam Engine, to the 1914 Executive 'Carolina' car, you will see some of the most beautiful train restorations in the Southeast, including 3 of the existing 4 cars from the old P&N Railway, plus Pullman Passenger and Sleeper cars and the Erie Lackawanna Dining Car #746. Open every Saturday 10-4, May 7 through October 15, or call for tours at any time but Sunday.

Call today!

www.greenwoodrrmuseum.com **864-229-7093**

TEXAS — **Rosenberg**

ROSENBERG RAILROAD MUSEUM
1921 Avenue F, Rosenberg, TX 77471

The Rosenberg Railroad Museum is dedicated to preservtion and education of railroading history and its impact on Fort Bend County. Exhibits Include 1970's Caboose, 1903 Tower 17, 1879 passenger car, Garden Railroad, model train layouts, and more! Open Wed-Fri. 10-3pm, Sat. 10-4pm, & Sunday 1-4 pm.

www.RosenbergRRMuseum.org **(281)633-2846**

WASHINGTON — **Othello**

OTHELLO'S MILWAUKEE ROAD INTERPRETIVE CABOOSE

Explore the history of the Milwaukee Road in an original caboose turned interpretive center. Photos, memorabilia, maps and more ignite your imagination. Bay window, rib side caboose is open year round, Tuesday through Saturday from 10am-5pm. Groups welcome. Various train items and artwork available for sale in adjacent historic Old Hotel Art Gallery, originally built as a train hotel.

www.facebook.com/theoldhotelothello **509-488-5936**

WISCONSIN — **Frederic**

1901 SOO LINE DEPOT
210 Oak Street West

Restored 1996 – Frederic Area Museum and State Trail Rest Stop – Soo Line wide-vision caboose #137. Weekends – Memorial Day through leaf season.

715-371-0574

www.fredericwi.com **1-800-222-POLK**

YOUR STATE — **Your City**

WISCONSIN — **Green Bay**

NATIONAL RAILROAD MUSEUM
2285 South Broadway

Explore dozens of historic trains and engaging exhibits at the National Railroad Museum, which is open year-round. Among our popular attractions are: the General Motors Aerotrain, Union Pacific "Big Boy" #4017, Pennsylvania Railroad GG-1 electric locomotive #4890, the Dwight D. Eisenhower A4 locomotive, and the world's largest collection of drumheads. Train rides are offered daily May-September (weekends in October).

www.nationalrrmuseum.org **920-437-7623**

WISCONSIN — **North Freedom**

MID-CONTINENT RAILWAY MUSEUM
E8948 Museum Road

MCRM is home to one of the nation's largest collections of restored wooden passenger cars. Take a 55-minute, 7-mile round-trip ride aboard 1915-era coach cars. Open weekends May-Oct, daily except Mondays mid-June-Labor Day. Join us for our Stars & Stripes event for shop tours on July 4-6!

www.midcontinent.org **800-930-1385**

WISCONSIN — **Osceola**

OSCEOLA & ST. CROIX VALLEY RAILWAY
114 Depot Road, Osceola, WI 54020

Join us for a scenic and memorable trip through the St. Croix Valley. Come for the 1920's-1950's passenger rail experience, the awesome scenery, or special events such as pizza or wine tasting trains, fall color train rides and the popular Pumpkin Express.

Individual, family and group tickets available. Also, be sure to visit the Minnesota Transportation Museum in Saint Paul to experience railroading history.

www.trainride.org **651-228-0263**

WISCONSIN — **Trego**

WISCONSIN GREAT NORTHERN RAILROAD
N6639 Dilly Lake Road

America's Only Moving
BED & BREAKFAST DINNER TRAIN

The train departs Tuesday through Saturday evening at 5:30 May through December. The train features a queen bed, toilet, sink and shower in each sleeper deluxe suite. Enjoy cocktails in the lounge and then move to the diner for a scrumptious 4-course chef prepared meal from our onboard kitchen. When the train returns to the station, view the starlit sky while trading railroad tales with other passengers around our gas fire on the patio. Wake up to a hot breakfast in the diner. See the world famous *Mark Twain Zephyr* at Trego Depot!

www.spoonertrainride.com **715-635-3200**

CLASSIFIEDS

Word Rate: per issue: 1 insertion — $1.57 per word, 6 insertions — $1.47 per word, 12 insertions — $1.37 per word. $35.00 MINIMUM per ad. Payment must accompany ad. To receive the discount you must order and prepay for all ads at one time. Count all initials, single numbers, groups of numbers, names, address number, street number or name, city, state, zip, phone numbers each as one word. Example: Paul P. Potter, 2102 Pacific St., Waukesha, WI 53202 would count as 9 words.
All Copy: Set in standard 6 point type. First several words only set in bold face. If possible, ads should be sent typewritten and categorized to ensure accuracy.
CLOSING DATES: July 2024 closes April 23, August closes May 20, September closes June 24, October closes July 23.
For TRAINS' private records, please furnish: a telephone number and when using a P.O. Box in your ad, a street address.
Send your ads to: *Trains* magazine – Classified Advertising 21027 Crossroads Circle, P.O. Box 1612 Waukesha, WI 53187-1612 Toll-free (888) 558-1544 Ext. 551
E-mail: classads@kalmbach.com

RAIL SHOWS AND EVENTS

MAY 4-5, 2024: Neuse River Valley Model Railroad Club 6th Annual SPRING Into TRAINS Show. Agri Supply Exposition Center, NC State Fairgrounds, 4825 Trinity Road, Raleigh, NC. 9am-5pm. Admission: $10 covers both days, 12 and under admitted free w/adult. 300 tables of model railroading and railroadiana. Contact George Lasley, 919-757-4503, email: gwlasley52@gmail.com, visit www.nrvclub.net

MAY 31-JUNE 1, 2024: Annual Johnson City, Tennessee, BIG TRAIN SHOW. Host: George L. Carter Railroad Museum. 64,000 sq.ft., 330+ tables. All scales, operating layouts, vendors, books, memorabilia, food. ETSU "Mini-Dome" Noon-6pm Friday, 10am-4pm Saturday. Admission: $8/day, under 12 Free. Free covered parking. Contact Roger Teinert 423-791-4937 or www.etsu.edu/railroad

JUNE 9, 2024: 48th Annual Kane County Railroadiana and Model Train Show. Kane County Fairgrounds, 525 South Randall Rd., St. Charles, IL. Sunday, 10:00am-3:00pm. Admission: $6.00 w/tax. Tables starting at $65.00. Information: 847-358-1185, RussFierce@aol.com or www.RRShows.com

All listed events were confirmed as active at the time of press. Please contact event sponsor for current status of the event.

LODGING

INN ON THE RIVER: Book your stay for a relaxing getaway overlooking the beautiful Mississippi! Guests are minutes from quaint restaurants, stores and many outdoor opportunities. Each room has a balcony for stunning views of the Mississippi River and the Burlington Northern-Santa fe Rail Line. Reservations: 608-534-7784 www.innontheriverwi.com or email: innontheriverwi@gmail.com

BOOKS AND MAGAZINES

"CHASING FIRE IN STEEL" book, last American steam locomotives worldwide. See sample pictures, information, reviews on eBay. Email pstephanus@aol.com to buy book for $50.

CAN DAN AND HIS CLUB SAVE their favorite engine from the scrap yard? Read the Deltic Disaster and Other Tales, and the sequel, That Which Was Lost, Deltic Disaster Part Two, available at Barnes & Noble.

COLLECTIBLES

TOP DOLLAR PAID for steam/diesel or electric builder plates. mr_slides@hotmail.com Telephone: 216-321-8446

TOP PRICES PAID for original steam, diesel and electric builder's and number plates. Have some quality plates for trade as well. rjmuldowney@comcast.net – 609-397-0293.

PHOTOS, PRINTS AND SLIDES

TOP DOLLAR PAID: for 35mm slide collections especially pre-1980. Mr. Slides, mr_slides@hotmail.com Telephone: 216-321-8446

RAILROAD ART

THE ESTATE OF WELL-KNOWN RAILROAD ARTIST, ANDREW HARMANTAS, is selling all remaining paintings from his collection. Paintings are of various railroads, steam, diesel, and various sizes. Majority are framed. Inquiries, visit www.andrewharmantasart.com

WANTED

ALL SLOT CARS WANTED. Any kind, any condition. Top dollar paid. PAUL at 248-760-6960. E-mail: slotcarguy@slotcarguy.com

ARE YOU GETTING THE BEST PRICE FOR YOUR TRAIN COLLECTION? Our list of discriminating buyers grows each day. They want bigger and better train collections to choose from! We specialize in O Gauge trains- Lionel, MTH, K-Line, Williams, Weaver, 3rd Rail, etc. as well as better trains in all scales. We also purchase store inventories. Plus, we can auction your trains with rates starting as low as 15%. We travel extensively all over the US. Give us a call today! Send us your list or contact us for more information at www.trainz.com/sell Trainz, 2740 Faith Industrial Dr., Buford, GA 30518, 866-285-5840, Scott@trainz.com Fax: 866-935-9504

LOOKING TO PURCHASE 1947 FREEDOM TRAIN: Collections, Photos, Scrapbooks, Pins, Footage and Pennants, Slides, Toys. G.R. Barker, 2191 Cook Rd., Ballston Lake, NY 12019 or E-mail: freedomtrain47@hotmail.com

PRR LW PULLMAN CAR Cast-iron door nameplates, 1938-1950. J.H. STEVENSON, Rocky River, OH 440-333-1092 jhstevenson8445@gmail.com

WANTED: SEARAILS POWERMAX MINNETONKA. Email: mno6200@aol.com

AUCTIONS

AMERICA'S PREMIER RAILROAD AUCTIONS: Consign your quality items. One piece to an entire collection. Large 8-1/2 X 11" auction catalogs contain full descriptions and hundreds of photographs. Auctions are jointly sponsored by the Depot Attic and Golden Spike Enterprises. The combined knowledge and experience of America's largest railroadiana firms will earn you "top dollar". Mail and fax bids are accepted. Information: Railroad Auction, PO Box 985, Land O Lakes, FL 34639. Phone: 813-949-7197.

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Waste no time

A southbound Amtrak *Northeast Regional* train bound for Virginia's Tidewater region flashes under the signal gantry at CFP57.3 on May 27, 2023. The train departed the Fredericksburg, Va., station a few minutes earlier and the engineer is not wasting any time getting the train up to track speed.

Big coal — part 1

A Norfolk Southern double-barrel hopper train passes through the Crewe, Va., yard without stopping for a crew change on May 1, 2021. The train begins with GE ES44DC No. 7563 and EMD SD70ACe No. 1202, then 100 empty coal cars.

Of a fine line

Norfolk & Western's J class, built in the railroad's Roanoke, Va., shops, ranks among the most powerful and beautiful 4-8-4 passenger locomotives of the steam era. On May 8, 2016, a restored No. 611 highballs westward toward Roanoke as it returns from an excursion to Lynchburg, Va.

Big coal — part 2

The double barrel NS hopper train continues through the Crewe, Va., yard on May 1, 2021. After the first 100 cars, two mid-train DPUs grind away — GE ES44AC No. 8183 and C44-9W No. 9634. Don't go anywhere. There are another 100 hopper cars coming.

All off?

On a cold January 2007 evening, a Virginia Rail Express train stands at Fredericksburg, Va., the last stop at the time. The conductor works to ensure any sleeping commuters have awakened and exited, preventing them from winding up in Crossroads Yard out in the wilds of Spotsylvania County where the train will spend the night.

Long train coming

Veteran CSX ES40DC No. 5495 is on the head end of 131 cars of mixed freight making up train No. M422 on Sept. 21, 2023. The train is rolling north on CSX's RF&P Subdivision near Lansdowne Road outside Fredericksburg, Va. It has just ducked under the signals at CFP57.3.

In the contemporary world, where everything is colorful, Jeffrey M. Morfit prefers to pursue traditional black and white railroad photography. The photographs he displays here were captured with either a Graflex 4x5 Crown or Speed Graphic camera. The developed film is presented as 8-by-10-inch prints. Being a resident of Falmouth, Va., a suburb of Fredericksburg, Morfit can be found capturing the trains of Norfolk Southern, CSX, Amtrak, and Virginia Rail Express as they move along the I-95 Corridor.

The run home

Virginia Railway Express commuter train P307-26 has just departed the station at Brooke, Va., on the evening of July 26, 2013. The train is accelerating toward the next station stop at Leeland Road, which is all of 5 minutes away. Today, Motive Power MP36PH-3C No. V60 is leading the train.